A Lecture

ON THE

INFECTION OF CONSUMPTION.*

BY

C. THEODORE WILLIAMS, M.V.O., M.D., F.R.C.P.,

CONSULTING PHYSICIAN TO KING EDWARD VII SANATORIUM, MIDHURST, AND THE HOSPITAL FOR CONSUMPTION, BROMPTON.

There are few subjects more difficult to deal with than that of the contagion of consumption, and yet there are perhaps none which call for more judicious and temperate handling. It is our duty to do all we can to protect the relations, friends, and attendants of the consumptive from danger, but at the same time we must not unnecessarily vex and harass him by cutting him off from all communication with his fellow beings and reducing him to the miserable condition of the leper of old.

There are many young men and young women in incipient stages of the disease who suffer but little from cough and have no expectoration: these carry out their occupations efficiently, and at the same time, especially if they have been inmates of a hospital or sanatorium for some months, live a hygienic life in their own homes and are gradually advancing to the condition of arrest. They often have been discharged from a sanatorium as fit for work and are probably now not infectious, or if they could carry infection, have been so carefully trained to deal with their secretions that danger from this source is practically eliminated. If, however, alarm is raised in the offices or institutions where they are employed, it might result in loss of occupation to these capable and active workers and their transference to the ranks of the unemployed, which would mean starvation to them. This is a very cruel proceeding, if unnecessary.

I propose in this lecture to examine the various sources of infection in pulmonary tuberculosis and to ascertain to what extent they are elements of causation or spread of the disease.

Husband and Wife Infection.

Sir Hermann Weber's[1] well-known cases, with those of Musgrave Clay[2] and of the Collective Investigation Record,[3] establish this form of infection beyond all doubt. I would shortly quote Wilson Fox's concise analysis of the evidence on this point, and some of his sensible remarks:

A. One phthisical man married several times, most of his wives becoming phthisical—13 cases.

B. Consumptive man, who died, transmitted to wife, widow infected second husband—3 cases.

C. Man infected wife and died. Widow re-married and also died of phthisis, as did her second husband after he had re-married. His widow lived and also married again, and her next husband died of phthisis.

D. Woman married in succession two phthisical husbands, and became phthisical after the death of the last—2 cases.

E. Wife, consumptive, died, having infected husband, who also infected a second wife—10 cases.

F. Consumptive wife before dying infected her husband, who later infected a second wife. This widow afterwards infected a second husband—1 case.

G. Woman died of consumption. The widower, not stated to be phthisical, married subsequently three other wives: total, four wives, of whom the first, second, and third died of phthisis, but the fouth wife, and apparently the husband, remained free from the disease.

In one out of three cases where consumptives married three wives, one wife survived, and out of nine cases where consumptive husbands married twice, the last wife survived in three instances, giving a total of thirteen husbands to thirty-one wives, of whom twenty-seven died and four lived in apparently good health. It would appear that the infecting husbands were often in an early stage of the disease when infection took place, and some survived their wives by many years.

Of course, in all these cases we must not lose sight of other sources of infection than coition, and must admit the possibility of the people living in insanitary houses containing tubercle bacilli laden dust on walls and floors, due to previous inmates having been consumptive and dirty, and we also know little about the adoption of measures employed to prevent contagion by inhalation or ingestion. In Sir Hermann Weber's cases the husbands appear to have been chronic cases of the disease in a quiescent state, and infection seems only to have taken place if the wives became pregnant, and then the disease assume a very acute form.

Infection through the Air Passages by Inhalation.

This, until recently, was generally accepted as the common method of infection of human beings, but as to the precise material of infection authorities differed, Flügge holding that it is by droplets which the consumptive expels during coughing, sometimes to a considerable distance from his mouth. These contain large numbers of tubercle bacilli, and are carried by inhalation into the smallest bronchia. Flügge[4] maintains that while infection of the lungs can take place through the ingestion of tubercle bacilli by the stomach, the commonest and most dangerous form is through the air passages. As regards the relative infective powers of pulverized dry sputum and spray, Flügge concluded from his experiments that "infection from pulverized dried sputum is doubtless possible; but it occurs relatively seldom, because particles fine enough to be readily conveyed by air can only be formed from completely dried sputum, and then in very limited quantities." B. Fraenkel's experiments on "droplets" are most interesting, and were carried out with great care.

Heymann carried out a most complete series of experiments to determine the local dispersion and limitation of the sputum drops.

He made consumptives cough on to glass plates, and from 4 patients he obtained abundant tubercle bacilli.

A patient was then placed for one and a half hours in an experimental chamber, in which plates were arranged in different positions to receive droplets. After the patient had left the chamber it was carefully closed and protected from sunlight for some hours. The deposits on the plates were then examined by inoculation experiments.

Where a patient held his handkerchief before his mouth when coughing it was found that out of 36 animals inoculated with material from plates taken out of the chamber, 11, or 30.5 per cent., were infected; and that of 34 animals inoculated from plates taken out of a chamber where the patient did *not* use a handkerchief, 24, or 70.5 per cent., were infected.

Heymann[5] found that infected particles are rarely carried more than one metre from the person coughing, so that protection against infection is easy to secure by keeping the patient at arm's length and by the latter using a handkerchief when coughing or sneezing.

The virulence of the tubercle bacilli from the natural spray, if kept in the dark, was lost within eighteen days at the most, but if exposed to the light was lost within three days. Heymann concludes that droplet infection is only operative in circumstances of closest intimacy, as in the intercourse of married people, of mother and child, among attendants on the sick and in factory rooms, workshops and offices. He is of opinion that spray and dust infection are equally important, one form taking precedence over the other according to circumstances.

Cornet,[6] in 1888, first clearly established that the dust in the vicinity of consumptives, especially dirty ones, frequently contains tubercle bacilli.

In England and among civilized nations more cleanly habits prevail than formerly, but as an instance of what is possible let me quote a letter just received from my friend, Dr. Quevli, of Tacoma:

During my eighteen years' practice in Tacoma, State of Washington, U.S.A., I have had quite a sprinkling of American Indians as patients, and the number of those suffering from tuberculosis was surprising.

My first visit to one of these tuberculous patients convinced me that their present mode of living was to a great extent the cause of it. The Indian to whose home I went was about the most intelligent of this tribe (the Siwash), and the patient was his wife. He, with his wife, two sons, and one daughter, lived in a cabin about 16 by 20 ft., which was their only room. In one corner stood the cooking stove, covered by dirty utensils containing remnants of food, which would be eaten later on. In the middle of the room stood a table covered with dishes, which showed no sign of recent washing. On the floor in one corner lay a mattress covered by a couple of dirty blankets, which served as a bed for the boys, aged 8 and 14, while in

* This lecture was to have been delivered before the International Conference on Tuberculosis at Stockholm in July, but was omitted through the author being prevented by a severe accident from fulfilling his engagement.

another corner a daughter aged 16 slept in a small wooden bed equally dirty. In a double bed with its head placed in the centre of a wall lay the patient. This bed also served for the husband, and the bedclothes were exceedingly filthy.

The woman had been suffering from tuberculosis for over one year, and she died one month after my first visit. She used no cuspidor, and on each side of the bed were masses of old and fresh sputum, on which swarms of flies feasted. That this patient had not received proper food or care of any kind is a foregone conclusion. I immediately ordered the daughter to scrub the floor; the father and I assisted her. The few extra bedclothes they had were as filthy as those on the beds, so no improvement could be made in that way.

On leaving I gave orders about cleaning and keeping the house in a sanitary condition. I came back in one week, and found that few, if any, of my orders had been followed. On the floor on either side of the bed were masses of sputum, and everything else about the same as before. I made two more visits before she died, but could do very little with them, except to enjoin that they must be careful with the sputum and follow the directions that the doctor usually gives in a tuberculous case.

Within three years the eldest boy and the daughter died of the same disease. I have had very nearly the same experience with most of my other Indian patients, and other doctors have told me that theirs have been about the same.

Tuberculosis is common among the Indians, and still more among the half-breeds of North America.

Most of the Indians, as a rule, besides being filthy, are also very improvident, using their means lavishly as long as they last, and, as a result, often for a long time they must live on poor food. Liquor—when it can be obtained—also plays a big part in ruining their constitutions.

In seven hospitals where consumptives had beds the dust was inoculated by Cornet into 94 animals, and 21.3 per cent. of these became tuberculous. In the dwellings and workplaces of consumptives 62 tests were made on 170 animals, and in 20 per cent. tuberculosis was produced.

Coates[7] and Delépine found the dust of the dirty houses of consumptives, who used no precautions, capable of inoculating animals with tubercle in 66.6 per cent.

Niven also obtained similar results from the dust of dirty houses in Manchester.

With regard to the above important chain of evidence as to the probability of the infection of human beings through the air passages by inhalation there are two weak points. The proof of infection is based entirely on the inoculation of guinea-pigs, and not on instances of infection of human beings, by the entry of the tubercle bacilli into the air passages, which would be evidence not to be gainsaid. Secondly, we know that tubercle bacilli will enter the nasal cavities of healthy persons, and have been detected there by Strauss, for instance, in students attending the wards of the Charité and Laënnec Hospitals in Paris, and among orderlies attending the consumptive wards.

But the tubercle bacilli appear to do no harm to these persons, probably because the constitutional resistance is too great to allow them to settle and multiply, which demonstrates how important a factor in the struggle the resisting power of the constitution or system is, and how much can be accomplished by assisting or supporting the same. When we reflect that the dust in our railway carriages, omnibuses, and trams is found to contain tubercle bacilli,[8] we must admit that the opportunities of inhaling it are not small.

According to StClair Thomson, in the healthy nose most of the bacteria inhaled are immediately stopped at the nostrils and the penetration of dust into the lungs is opposed in various ways, and is by no means easy. Angles are met with in the nostrils, the nasal cavities, the pharynx, and even in the larynx and bronchi, which oppose the full entry of the dried sputum into the alveoli, but perhaps the greatest protection is to be found in the structure of the trachea and primary bronchi. In the trachea a triple layer of columnar epithelium, the upper one furnished with cilia, promoting a strong outward movement, forms an important defence against intruders. The effect of this is to be seen when a crumb of bread goes the wrong way, or a little dust is inhaled, the reflex irritability is excited, and after a fit of coughing and sneezing the offending particles are speedily expelled.

Many years ago[9] I made a series of experiments on the introduction of various medicinal substances into the lungs, and I was able to show that it was very difficult to reach the lungs in this way, whereas through swallowing, by the stomach or by hypodermic injection they could be easily reached.

Though it is improbable that inhalation is the principal means of lung infection, there is every likelihood of some infection taking place through the upper air passages, and that the bacilli enter the lymphatics of the mouth and infect the lymphatic glands of this region and the tonsils, which are often the seat of tubercle. The frequent occurrence of strumous submaxillary and cervical glands may be due to this cause.

INFECTION THROUGH THE INTESTINES.

The question of the path of infection in pulmonary tuberculosis, whether by the lungs or the intestines, so ably discussed at the Conference of Tuberculosis at Vienna, has been definitely settled by the epoch-making experiments of Calmette, Guérin, and Breton, extended by Vansteenberghe and Grysez, and confirmed by a most interesting series, carried out on guinea-pigs, by Sir William Whitla and Professor Symmers of Belfast.[10] Finely divided emulsions of living bacilli ground up in an agate mortar with decoction of linseed were injected into guinea-pigs' stomachs, and were absorbed by the intestinal surface, producing extensive tuberculous deposits in the mesenteric glands, in the lungs and other viscera. When the animals lived beyond thirty days, the lungs were invariably found to be studded with caseous tubercle, and the broncho-tracheal glands also suffered. In the guinea-pigs which survived the injections from fifty to sixty days, the deep cervical glands were nearly always found to be decidedly tuberculous.

The involvement of the cervical lymphatics is of the utmost importance, as the usually accepted theory is that when these glands are found to be tuberculous in the human subject, they prove that the bacilli have effected an entrance through the mucous membrane of the mouth, tonsils, or pharynx. A subsequent experiment by Calmette and his fellow workers, of injecting tubercle bacilli through a tube into the stomach of a guinea-pig, and killing the animal in ten days, showed the infection of the whole lymphatic system.

We know now, from the researches of Nicholas and Descos, Ravenel, Römer, von Behring, and others, that the tubercle bacillus can pass through the intestinal mucous membrane without causing any lesion or leaving any local evidence of its point of entrance.

Thus the possibility, and, indeed, probability, of the lungs and lymphatic system being infected through the intestines is proved without doubt, and the converse—that is, the improbability of lung infection by inhalation—is shown by an instructive experiment by Vansteenberghe and Grysez, who submitted rabbits and guinea-pigs to an atmosphere laden with fine carbon particles by keeping them in a glass cage in which a lamp fed by turpentine was burning. The upper air passages were found laden with carbon, some of which had also found its way into the pulmonary alveoli when the experiment was of long duration, but in no case was carbon found in the parenchyma of the lungs, and in the rabbit, which breathes through the nose, the carbon particles were never found to have reached even as far as the trachea. In another experiment with the carbon vapour one bronchus was plugged with cotton-wool and the other left free. The animal was exposed to a prolonged inhalation of carbon dust with one lung shut off from the air and the other exposed to it. The animal was killed and both lungs carefully examined. It was found that the free lung showed carbon deposits in the bronchi and in the external portions of the alveoli, whilst the lung isolated from the carboniferous atmosphere manifested intra-parenchymatous deposits, the alveoli and bronchi being free.

These observers were therefore justified in their conclusion that physiological anthracosis is due in such cases to intestinal absorption of particles arrested in the nasal and pharyngeal passages and afterwards swallowed with the saliva and nasal mucus, to be carried to the pulmonary parenchyma by the blood stream.

The most important item in this form of infection is that of milk and meat, and after the conclusive evidence of the British Royal Commissioners, confirmed by numerous other authorities, there can be no longer any doubt as to the danger to the human body, and especially to children, from bovine tubercle bacilli contained in milk. The danger of infection from the meat is not so great.

Infection through the Skin and Mucous Membranes by Wounds.

This is not a common method of infection, but sundry cases are on record which prove its possibility and indicate the undoubted danger from that source. A well-known instance was that of a nurse who accidentally cut her hand when she broke a spittoon containing tuberculous sputum, and was infected therefrom, and died eventually of phthisis.

At all the consumption hospitals certain porters are told off to destroy the sputum and sterilize the vessels containing it. In spite of every precaution being taken to prevent infection, these men occasionally get infected, generally through neglect of the proper precautions. At the Brompton Hospital there have been several cases, of which Mr. Stanley Boyd has published some examples;[11] later on I will give some cases.

Hospital Infection.

In August, 1882, shortly after the discovery of the tubercle bacillus by Koch, I read a paper at a meeting of the British Medical Association at Worcester on the "Contagion of Phthisis," which was[12] afterwards reprinted and had a large circulation. It was also translated into various languages. The paper contained the experience of the Brompton Hospital staff as regards the infection of phthisis for the first thirty-six years of the hospital's existence, the statistics being prepared by the late Dr. Cotton, Mr. Virtue Edwards, and myself, and related to several hundreds of individuals. This paper was very well received at the Worcester meeting, and at a later date was quoted by Dr. Wilson Fox, Professor von Hirsch, and Dr. Bulstrode as sound evidence on the subject.

Dr. James Andrew gave similar evidence with reference to the staff of the Victoria Park Hospital, and Dr. Robertson as regards the Ventnor Hospital, Isle of Wight. I was under the impression that the evidence of these great institutions, the largest in England, carefully collected by skilled observers, and all coinciding in the same conclusions, had settled the question of the rarity of infection to the resident staffs of hospitals from consumptive patients, but Dr. Arthur Newsholme, in a recent work,[13] has thrown doubt on these statistics as proofs of the rarity of infection in hospitals, and describes them "as examples of investigation in which the data are, possibly owing to insuperable difficulties, incomplete, and insufficient to justify any dogmatic statement."

I will now deal with that phase of Dr. Newsholme's objections which calls in question the after-histories of the Brompton Hospital staff. He says: "It is not certain how thoroughly the subsequent history of workers in those hospitals was traced. It is likely that such workers as had died were less completely traced than those still alive."

My paper states: "Of the four resident medical officers who have held office from 1846, when the hospital was founded, to 1882, all are alive and tolerably well. Mr. Virtue Edwards held the post for twenty-five years without any symptoms of lung disease, and still enjoys good health. Of the others, two showed at some period of their residence signs of hospitalism but none of consumption."

As regards the clinical assistants, or, as they are now called, "house-physicians," I state that of 150, 8 became consumptive at some time or another of their lives, and 5 died. The histories of the first 75 were traced by Mr. Virtue Edwards, who knew most of them during his long term of office, and kept them in view afterwards, and are as follows: Of the first 16, 1 became consumptive, of the next 59, 4 became so, but none of them, according to Mr. Virtue Edwards, showed any sign or symptoms of the disease during their residence of six months in the hospital. The history of the last 75 was investigated by myself, and I traced them all but 3. Of these 72, 1 had died from other causes than tuberculosis, 2 had died of consumption; the first of these had haemoptysis previous to residence, and in the other case the disease came on one, if not two, years after leaving the hospital, the clinical assistant being quite well during his term of office. Another, who was overworked, became consumptive while in the hospital, but has since recovered. "The remaining 69 (including the last mentioned) are all well, and actively engaged in practice, many of them holding distinguished positions in the medical profession."

I do not propose to go into all the categories of those serving the hospital, but I think enough has been stated to prove that the evidence at my disposal was sufficient, and that the after-history of all these members of the resident medical staff was, with few exceptions, carefully and successfully traced.

It is quite possible that some of the 8 cases of consumption among the 150 house-physicians were due to hospital infection which developed at a later date, but what is that number in proportion to the total?

It would have been impossible to have investigated the after-history of many of the resident staff, if the hospital had not had the advantage of Mr. and Mrs. Virtue Edwards's valuable assistance, the former having been resident medical officer for twenty-five years, and the latter matron for twenty-four years, both keeping records of almost all the members of the staff and household.

Professor Cornet[14] also objected that the numbers of our statistics were too small, and that in the second place the persons constituting the material were kept under observation for far too brief a period. I cannot admit that 377 is a small number of persons to be exposed to infection, most of them for years, and the critics seem to have overlooked the fact that all the medical officers held office for at least six months and many much longer, and that we gave a complete history of the majority up to date.

I propose now to give some statistics of the Brompton Hospital medical staff resident *since 1882*, the date of my previous paper.

The hospital has largely increased its number of beds, and instead of 240 beds, to which my last statistics related, it numbers 318, while the Frimley Sanatorium has added another 140 beds, making a total of 458 beds. This increase in the patients has necessitated augmentation in the resident medical staff at the hospital and of new appointments at the sanatorium.

It is impossible to give complete statistics of the nurses and servants on account of their short periods of service and the frequent changes. There are, however, a number of nurses, and especially of sisters, who have been in the hospital for many years, some twenty-five, some twenty years, and the occurrence of infection of phthisis among them is almost unknown, but the newcomers do not remain long and are difficult to trace. I do not, therefore, intend to include the nurses, but to speak chiefly of the medical officers.

Resident Medical Officers.

Since 1882 there have been eleven whose period of office has varied from one to five years. Two have died, one from brain disease during residence, and one from pneumonia several years after leaving. The rest are well and actively engaged in different departments of practice, never having shown any symptoms of consumption either during their term of office or subsequently.

Assistant Resident Medical Officers.

Omitting those who only held office as substitutes or for quite short periods, there have been fourteen since 1882. The duties of this officer are to assist, and if needs be to act as substitute for, the resident medical officer, to assist in *post-mortem* examinations, and to draw up the hospital medical reports.

The assistant resident medical officer is generally selected from former house-physicians. None of the fourteen died during their residence in the hospital, which varied from three months to five years, but one contracted phthisis from a *post-mortem* wound during his term of office, and recovered completely under sanatorium treatment.

Five at a later date became resident medical officers, and of these two died (not of tuberculosis), but their deaths are included in the statistics of resident medical officers. The rest are all living, and busily engaged in the practice of their profession.

House-Physicians and Clinical Assistants.

Since 1882 there have been 181 of these officers, who are young qualified medical men residing in the hospital for six months, and during that time engaged in the treatment of patients and in recording cases.

I have succeeded in tracing 176 out of 181, and so will confine my statistics to this number.

None of these house-physicians died or showed symptoms of consumption during their residence, but in some instances they became consumptive later. Twelve have died since quitting the hospital—1 of apoplexy, 1 of appendicitis, 2 from enteric fever, 1 from pneumonia, 1 from pleurisy and pulmonary oedema, 1 from septic poisoning after a dissecting wound, 1 from an overdose of morphine, 1 from causes not tuberculous. One became resident medical officer and died from an acute non-tuberculous brain attack. Two became medical officers of a Poor Law infirmary and of a hospital respectively, and both died of phthisis some months after leaving the Brompton Hospital. It is possible the disease may have been contracted at Brompton, or else in the hospital and infirmary in which they died, in both of which institutions cases of advanced consumption were admitted. One house-physician became consumptive fourteen years after residence, and has quite recovered. Another became consumptive four years after leaving the hospital, and has recovered.

At the Frimley Sanatorium, opened five years ago, there has been one medical superintendent and four assistants in succession, all of whom enjoy good health. They have held office on an average for one year.

Porters.

There have been 57 resident porters and 79 non-resident since 1882, and of this number 6 have become affected with consumption and 3 of these have died. Three porters are told off to assist in the sterilization of the linen and in the destruction of the sputum, and are called sterilizing porters, and the three deaths include two of these, of whom I will give a typical case later. The other porters are employed in various occupations, but whether resident or non-resident, they all have to go into the wards from time to time to carry food, medicines, parcels, and at times patients. One porter acts as storekeeper, and of these storekeepers two in succession have been attacked with consumption and one died. The present storekeeper has been affected, but has recovered and has returned to duty.

Pathologist's Assistants.

These assist the pathologist in performing autopsies and making preparations for the museum. There have been four since 1882, of whom one has been affected with consumption, whose case is given below.

Physicians and Assistant Physicians.

There has been no case of consumption among the physicians since 1882; among the assistant physicians one has died of consumption. His lungs were affected before he was appointed, and he was only a few months in office.

Dispensers.

There have been twenty-three dispensers since 1882. These have to supply medicines to the out-patients through a hatch wall, and have nothing to do with the in-patients, as the medicines are conveyed to the wards by nurses and porters. None of these have been infected.

I will now give details of the two cases of infection alluded to before.

CASE I.

Alfred B., aged 41. No consumption in family.

History.

For twelve years served in the navy, and during the last seven years has been indoor porter at the Brompton Hospital, and enjoyed good health till February, 1908. His duties lay principally in the sputum and sterilizing departments, which he entered in April, 1905, and these duties were (1) to carry the mattresses of patients who had died of phthisis and the sheets and bedding of bad cases from the wards to the disinfector, all these being conveyed in bags, passed through the sterilizer, and returned to the wards in bags. Here the only possible period of infection was when these articles were removed from the bags and passed by hand into the sterilizer. The trays for the sputum cups were also placed in the sterilizer. (2) On Sundays (that is, on two out of every three) he had to remove the sputum cups from the galleries and convey them by lift and trolley to the sputum room. There the sputum was emptied from the cups into the steam boiler, and the cups having been washed with soda and water, were all sterilized by steam. For the handling of the cups india-rubber gloves are provided, and B. maintains that he always used the same.

In February, 1908, he complained of pains in his back, and was treated by the resident medical officer, Dr. Shrubsall, for lumbago, which subsided under appropriate treatment. He remained at work till June, when Dr. Shrubsall saw him again, and, examining his chest, detected slight signs of tuberculous disease. He was ordered to bed in the hospital, though he had no cough, and after two months' treatment he greatly improved, and gained 5 lb. in weight. In August he was sent to Frimley Sanatorium, where he remained four months, and, being put on walks and graduated labour, rose to the third standard of the latter, and was discharged as fit to return to work. At the end of November, 1908, he resumed his duties at the sterilizer and in the sputum room, and remained at this occupation till February, 1909, keeping well, but was then transferred to the lighter and more wholesome occupation of cleaning windows and sweeping the garden walks. Cough commenced during his stay at Frimley, and has continued ever since.

Present Condition.

He is much emaciated, especially over the thoracic walls. The chest is narrow and poorly developed. There are hectic spots on the cheeks, though the mouth temperature is subnormal, 97.1° F. Appetite good. Weight, 9 st. 2 lb. Pulse 96. Deficiency of movement over the front chest. On the right side of the chest crepitation is heard to the fourth rib, also above the scapula; dullness and broncophony are detected to third rib. On the left side there are some wheezing sounds, but no dullness. Crepitation under the left clavicle can be detected.

This is a remarkable case of infection, because there is no proof, in spite of his occupation, of any wound in his hands through which the system might become infected. Infection must therefore have taken place through the lungs or stomach, by inhalation or swallowing the dried sputum. After the experiments of Ernest Oberworth and Lydia Rabinowitsch[15] on sucking-pigs, which show that tubercle bacilli pass directly from the intestines into the lungs, it is more probable that infection followed the swallowing of dried and powdered sputum rather than inhalation of the same, but we must not lose sight of the possibility of infection by the skin in a case where the hands come into play.

CASE II.

J. M., aged 71, formerly in the Indian Army Medical Service and for twenty-one years assistant to the pathologist of the Brompton Hospital. Here his duties consisted of performing autopsies, and specially of opening and sewing up the bodies of consumptives and others who had died in the hospital, and also of staining specimens of sputum and cutting lung sections. In the examination of the tuberculous sputum one day, to quote Mr. Stanley Boyd's excellent account of the case,[16] "he employed a steel pen to spread it upon a covering glass, and left it projecting beyond the edge of the table and brought his hand forcibly against its point. The nib was driven into the proximal end of the flexor sheath of the ring finger. This occurred in the middle of June, 1900. He immediately tried to introduce fuming nitric acid into the wound caused by the pen, and possibly disinfected the *surface* by this means but not the *depths*. A hard lump gradually formed in the palm and extended down the ring finger, which became flexed, stiff, and painful. He was treated by means of a palmar splint, and was sent to Brighton for some weeks." He did not improve and returned to London.

In August Mr. Stanley Boyd found the finger contracted, and that the middle and little fingers also were being drawn down into the palm. "A long, low, tense swelling occupied the whole length of the flexor sheath of the ring finger. The diagnosis was tuberculous teno-synovitis." Mr. Boyd split the tendon sheath almost completely open and cut down on to a quantity of granulation tissue, which showed no cheesy degeneration and was not vascular. The whole of this was removed and pure carbolic acid applied to the surface of tendon and sheath. He also removed a superficial gland. The result was absolutely satisfactory. Six months after the operation he was quite well, and although extension of the finger was somewhat limited by the long longitudinal scar on its palmar aspect, he enjoyed fair use of his fingers, and there had been no recurrence of the disease. A section of the granulation tissue removed showed several giant-cell systems in great perfection.

In April, 1904—or nearly four years from the date of the infection—cough and expectoration came on, attended by general malaise though not by fever, and he was admitted into the Brompton Hospital in May, when the sputum was found to contain tubercle bacilli. He had wasted very much. He improved considerably, gained flesh and strength, and after ten months' residence was discharged free from cough. The sputum had been examined several times, with negative result.

May 18th, 1909. I examined M. and found him fairly well. He had retired on a pension from the hospital, and seldom had

cough or expectoration; the last specimen, examined some months ago, gave negative results. His weight was 10 st. 8 lb. The left chest gave a smaller measurement than the right by ½ in. at the level of the third rib, and of 1 in. at the level of the fifth rib. There was marked dullness in the first interspace on the left side and bronchophony from the clavicle to the third rib. The palmar cicatrix was quite healthy.

There is but little doubt that this man was inoculated by the pen containing sputum, and that he suffered afterwards from tuberculous teno-synovitis, for the tissue removed by Mr. Boyd was of a distinctly tuberculous character—witness the giant cells found therein—but the curious feature of the case was that nearly four years elapsed before the lungs showed any symptoms of being attacked. We are driven to one of two conclusions: Either that the infecting material—that is, the tubercle bacillus—had been carried to the lungs through the lymphatics, and had remained dormant for years, until a depressed condition of the patient determined its manifestation, or that there was altogether a fresh infection.

Either of these is possible. In favour of the first there are many instances of caseous lymphatic glands being found in autopsies, which have given rise to no symptoms during life, and whose existence was unsuspected, and we know that the connexion of various parts of the body with the lungs through the lymphatic system is intimate and extensive. In favour of the second, it must be admitted, a pathological assistant at a hospital for consumption has abundant opportunities of fresh infection unless he scrupulously observes every precaution. The use of india-rubber gloves, which are indispensable, is not always carried out, and operators, when they want a firm grip of certain parts of the cadaver, sometimes for a while dispense with them, thus exposing themselves to grave danger. There are many instances of infection of the tendons of the hands with tuberculosis where a servant has broken the sputum receiver of a consumptive and got some of the sputum into her hand, and I would refer you to Mr. Stanley Boyd's paper for the same.

But to return to the Brompton statistics for the last eighteen years. Among the resident medical officers there were no cases of consumption; among the assistant resident medical officers one (from inoculation), and among the house-physicians none were affected during residence. Two subsequently died of acute phthisis, when holding resident appointments in hospitals where cases of consumption are admitted, and one was attacked with consumption fourteen years after he left the hospital, and recovered.

The figures do not testify to much danger of infection to those who have the care of consumptives, but show that with proper precautions such service is quite safe. At the same time occurrence of tuberculosis among the porters, especially among those who handle the sputum, demonstrates where the true danger lies, and inculcates the importance of dealing effectually with this element of danger.

These statistics are even more favourable than those of the Brompton Hospital published by me in 1882, and this might be expected under the circumstances, as the hospital has greatly improved its accommodation and built a fine sanatorium for early cases.

Saugman[17] gives some valuable statistics as regards infection of medical men engaged in sanatorium work, and he notes that in answer to inquiries he found very few medical men wore masks or took special precautions during the throat and lung examinations of their patients. Saugman applied to 112 institutions, and received answers from 65 sanatoriums in Germany, France, Austria, Hungary, Switzerland, Norway, Sweden, Holland, and Finland. Saugman only included doctors who had resided in the sanatorium and treated patients for at least three months, and he excluded six who were exclusively engaged in bacteriology. Out of 289 from whom he could obtain information, 107 had been previously tuberculous and 182 regarded themselves as healthy. Saugman excluded from his figures any doctor who had been tuberculous before entering the sanatorium, if the disease had shown a fresh outbreak in the sanatorium. Of these 107 old cases of tuberculosis 1 died of cancer of the sternum, 16 died of tuberculosis, 9 still show signs of tuberculosis, and 73 are healthy. The average period of duty of these doctors in an institution was three and a half years, and the average period under observation till death, or up to 1902, the date of the report, was six and a half years. Among these old cases of tuberculosis was one in which fresh symptoms appeared while in the sanatorium, which were found to be due to the presence of the Timothy bacillus, not of the tubercle bacillus. There was one instance of fresh infection in a second medical officer, who had laboured nine to ten hours a day for two and a quarter months among very bad cases. Of 174 healthy doctors who had spent an average of three years in a sanatorium and whose after-history was traced for three and a half years, 2 or 3 were attacked with tubercle but quite recovered, and not one had died of tuberculosis; 5 died of other diseases, and 166 remain quite healthy. Saugman also gives statistics of 66 throat specialists from eight clinics, from which he had obtained facts. One previously tuberculous is, after seventeen years of great activity in laryngeal practice, in excellent health. The rest have been for a period of four years engaged in laryngeal work, and have never suffered from tuberculosis.

The result of these statistics showed that two or at most three of the 174 sanatorium doctors were affected with tuberculosis—that is, 1.78 per cent.—and none of the sixty-four laryngologists suffered at all.

I have reviewed the principal methods of infection in consumption and endeavoured to assign to each its proper value as an etiological factor, but when this is accomplished, it will be found that there is something behind all these factors, in the individual strength of constitution, on which mainly depends the question of infection or non-infection. The healthy individual can defy the tubercle bacillus, the same person depressed by want, impure air, or recovering from acute disease cannot, and falls a victim to his attack. But under improved conditions his constitution may rally, and after a long struggle overcome and expel the invader.

Concerning the sources of infection, ingestion of tuberculous material by the intestines is the commonest, inhalation by the air passages comparatively rare, except that which occurs in the upper air passages, affecting the lungs through the lymphatics. Infection through wounds of the skin and mucous membrane is not common, but occurs among those who handle sputum and other tuberculous material where proper precautions are omitted.

Infection by coition, though it occurs occasionally, is rare.

Finally, all infection from consumptive patients can be avoided if the well recognized precautionary measures are adopted and carried out thoroughly.

I must thank several former resident medical officers, Drs. Waugh, Felkin, Paterson, and the present resident medical officer, Dr. McNalty, with the secretary, Mr. Frederick Wood, for much assistance in the preparation of the recent Brompton Hospital statistics.

REFERENCES

[1] *Trans. Clin. Soc.*, vol. vii, 1874. [2] *Etude sur la contagiosité de la phthisie pulmonaire*, 1879. [3] BRITISH MEDICAL JOURNAL. [4] Die Verbreitung der Phthise durch staubförmiges Sputum und beim Husten verspritzen Tröpschen, *Zeit. f. Hyg. u. Inf. Kr.*, xxx, 107. [5] Newsholme, *Prevention of Tuberculosis*, p. 92. [6] Nothnagel, Tuberculosis, *System of Medicine*. [7] *Sanitary Journal*, No. 189, p. 343. [8] Newsholme, p. 100. [9] BRITISH MEDICAL JOURNAL, 1888. [10] *Lancet*, July 18th, 1908. [11] *Clinical Journal*, October 21st, 1901. [12] BRITISH MEDICAL JOURNAL, September 30th, 1882. [13] *Prevention of Tuberculosis*, p. 152. [14] Tuberculosis, Nothnagel's *Encyclopaedia of Practical Medicine*, p. 265. [15] *Clinical Journal*, June 26th, 1901. [16] *Berl klin. Woch.*, 1908, p. 298. [17] *Zeit. für Tuberculose*. Also see article "Pulmonary Tuberculosis," in Allbutt and Rolleston's *System of Medicine*, 2nd edition, for many other references.

NEXT year a Japan-British Exhibition will be held at the White City, Shepherd's Bush, and an appeal, signed by Prince Arthur of Connaught, Honorary President, and the Duke of Norfolk, President, has been issued to British manufacturers and art owners to help in making the exhibition representative.

AMONG certain new regulations issued by the Board of Health in Boston, U.S.A., relative to the conduct of the milk trade, is one which provides that on and after January 1st, 1910, all milk sold elsewhere than in hotels and restaurants shall be delivered in tightly-capped receptacles of a pattern approved by the board. Another regulation, which comes into operation immediately, forbids the sale of milk in the same room in which it is bottled, and prohibits any mixture of milk with skim milk or condensed milk, or water, for the purposes of sale, except in the preparation of modified milk.

Three Demonstrations

ON

CONGENITAL MALFORMATIONS OF PALATE, FACE, AND NECK.

GIVEN AT THE ROYAL COLLEGE OF SURGEONS, ENGLAND.

BY

PROFESSOR ARTHUR KEITH, M.D., F.R.C.S.ENG.,

CONSERVATOR OF THE MUSEUM.

III.—MALDEVELOPMENT OF THE EXTERNAL EAR.

IN Figs. 21, 22, and 23 are represented the more common forms of accessory auricular appendages. Fig. 21 is from one of the five examples in the college collection. There is here a very distinct arrest in the closure of the first visceral cleft on the sides of which the external ear is formed. The tragus, antitragus, and meatus are pulled towards the chin. The condition was associated with double cleft of the palate and absence of the auditory nerve. In all the three specimens figured the tragus is subdivided, each half projecting as a separate process to a varying degree. A process derived from a subdivision of the tragus is the most common form of auricular appendage. An appeal to comparative anatomy has provided no explanation to the condition. Another very common form of appendix is that shown in Fig. 22, C. It projects from the skin immediately in front of the ascending crus of the helix; when dissected its base is found to be connected with the ascending crus of the helix and to represent the spina helicis, which is usually buried in the subcutaneous tissues, but here projects on the surface. The pendulous process on the cheek (see Fig. 23) is also a form of auricular appendix. There are three specimens in this museum, and I have seen two others. The cheek appendages occur along the line marked in Fig. 23, a line represented by a fissure in cases such as those published by Mr. J. H. Morgan[1] and Dr. Edginton.[2] They are pendulous bodies, consisting of a fibrous core covered by skin. In two of our specimens we found a slight cartilaginous rod in the subcutaneous tissue at the point of attachment of the appendix, passing from the base towards the ear, showing that the cheek processes are really detached elements of the ear. As to the meaning of auricular appendages, I am altogether uncertain; all the specimens in museums show that they are associated with grave malformations, such as club-foot, cleft palate, atresia ani, spina bifida; the cause of the one condition is evidently the cause of the others. Auricular appendages, if they occur alone, are signs of an inherited tendency to grave malformation. The fissures which pass from the angle of the mouth to the ears, the processes which occur on the cheek, and the ventral extension of the tragus (Fig. 21) are probably caused, as Ballantyne has inferred, by the occurrence of amniotic adhesions.

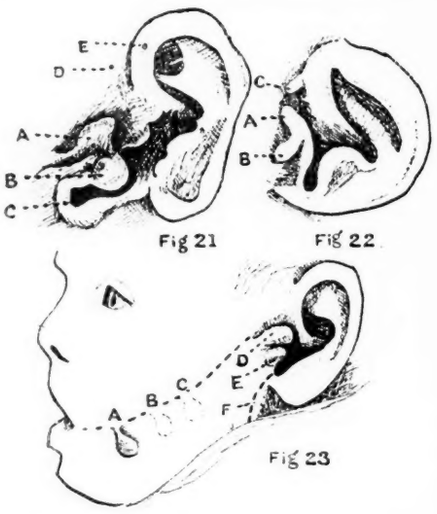


Fig. 21.—Ear of child with cleft palate. A, B, Appendages formed out of the tragus; C, meatus dragged downwards and forwards; D, E, positions of auricular fistulae. Fig. 22.—Ear of an anencephalic fetus, showing A, B, appendages developed from tragus; C, from spine of helix. Fig. 23.—A, B, C, Position of cheek appendages, along the position of a bucco-auricular cleft; D, E, appendages of the tragus; F, position of first visceral cleft (from a photograph in the possession of Dr. William Wright).

Fistulae connected with the external ear, which were first described in this country by Sir James Paget,[3] are very imperfectly represented in our museum. There is evidently a relationship between auricular fistulae and auricular appendages, for I noted that one of the commonest sites for their occurrence is in front of the ascending crus of the helix, the point at which a depression or fistula would be formed if a prehelicial appendage became submerged during development (see Figs. 21, 22). The fistula which is found on the ascending helix occurs at the point where two tubercles fuse to form the anterior or mandibular part of the helix. When one remembers that the external ear is formed out of six tubercles which fuse together across the first cleft, one wonders that gaps or fistulae are not of more common occurrence.* The external auditory meatus is a secondary formation of the first cleft. It is at first a solid plug of epithelium which afterwards (ninth week) becomes canaliculized. A specimen in the college collection shows an arrest in the opening up of the meatus, while the external ear is normally formed. In this case, too, the eighth nerve is absent, and it is observed that malformation of the external ear is frequently attended by a degree of deafness. In the two human specimens in the college museum, with absence or grave arrest of the external ear, there is absence of the auditory nerve.

Dermoids occur in connexion with the first visceral cleft. There are three specimens in the college collection, two of them being retro-auricular and one pre-auricular. I noted two specimens in school museums in which there was a retro-auricular fistula or depression; it is probable that dermoids are formed in connexion with such recesses, which are of uncertain origin.

TABLE IV.

	A.	B.	C.	Total.
Absence, more or less complete, of external ear	2	2	2	6
Accessory appendages of ear	5	2	0	7
Auricular fistulae	—	3	0	3
Cervical appendages	1	—	2	3
Auricular dermoids	3	1	0	4
Auricular fistula with teeth	—	—	2	2
Malformation of tongue	2	1	1	4
Sublingual dermoids	4	1	0	5
Cysts of cervical sinus	12	6	—	18
Cysts or tumours connected with median thyroids	3	2	—	5
Cysts from lateral aberrant thyroids	1	—	—	1
Congenital tumours of the neck	5	2	—	7

A, Specimens (human) in the Museum of the Royal College of Surgeons.

B, Specimens (human) in the museums of metropolitan medical schools.

C, Specimens from domestic animals, chiefly in the Museum of the Royal College of Surgeons.

Cervical Appendages.

The only representative of these abnormal structures in metropolitan museums is a specimen (535) presented to the college collection by Mr. Frederic Eve. He removed it from the neck of a boy, its situation being near the midpoint of the anterior border of the right sterno-mastoid. The lamina of cartilage which supported the process was continuous with a small irregular bar of bone. Mr. Bland-Sutton[4] states that the cartilage is elastic in nature, and that the appendix is usually associated with a cervical fistula. On the other hand, Rieffel,[5] who has collected 37 cases, found that a fistula was never associated with

* In 50,000 school children Dr. Francis Warner observed 33 with auricular appendages. In 2,000 people, Urbantschitsch (quoted by Paget) saw 12 with auricular fistulae.

the appendage. In the college collection there are specimens representing the cervical appendage in the pig and goat. It is usually believed that cervical appendages are really auricles developed in connexion with the second cleft. We know that there is a tendency in vertebrates for a segment of the body to assume the characters of an adjoining segment; the last lumbar vertebra, for example, may assume the characters of the first sacral. Here we may have a manifestation on the part of the second cleft to assume to some degree the characters peculiar to the first. There is a difficulty in this assumption which will be dealt with when speaking of cervical fistulae, namely, the second cleft has no separate opening on the neck; it opens in common with the other clefts through the cervical sinus.

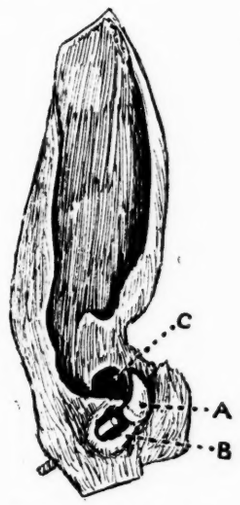


Fig. 24.—Ear of ewe showing accessory ostium (Preparation 531, presented by Mr. Bland-Sutton). A, Incisor like tooth; B, ostium distended by rod; C, external auditory meatus.

Accessory Ostia.

In Fig. 24 is represented the external ear of a sheep, given to the college museum by Mr. Bland-Sutton, who has also described and explained the condition shown by the specimen. Below the ear is a small meatus-like opening on the anterior margin of which is implanted a tooth, apparently an incisor. The abnormal opening may lead into the pharynx or end blindly. Although situated so closely to the ear there can be little doubt the opening really represents an accessory mouth. The duplication of the hind gut, and formation of two anal openings is a well known condition; duplication of the foregut leading to the formation of a double mouth is also well known. One of the mouths may undergo retrograde changes or imperfect development, and thus come to assume the form seen in these subauricular ostia.

Malformation of the Tongue.

Amongst the specimens at my disposal there are four —three of them in the college collection— which show malformation of the tongue. The head of a lamb (No. 186) shows a most interesting anomaly. On one side the lower jaw and all the parts developed in connexion with it are absent, so that the buccal cavity and tongue are fully exposed on the cheek. The basal part of the tongue—the part behind the foramen caecum and V-shaped sulcus—is fully formed. That part is formed out from the second and third arches, but the anterior or mandibular part of the tongue is only formed on the sound side; on the side of the defect the corresponding half is absent. The specimen demonstrates two things: (1) That even the anterior part of the tongue is bilateral in origin; (2) that the anterior part of the tongue is entirely derived from the mandibular arch of the embryo, for in the specimen under discussion the right half of this arch and all the structures derived from it are absent. The two other specimens of lingual malformations are to be found in the pathological series of the college museum, where they are classed as tumours of the tongue (Nos. A 2271 and A 2271a); they are exactly of the same type; one was obtained from a deformed, the other from an anencephalic child. One is represented in Fig. 25. At first sight it appears as if the anterior part of the tongue were absent, but such is not the case; it is the basal part of the tongue, the part behind the V sulcus and derived from the second and third visceral arches, which is arrested in development. Combined with this there are two other anomalies: (1) The submaxillary gland has been arrested in its development, and forms a clustered glandular mass within the frenum and along the side of the tongue; (2) Meckel's cartilage has become ossified into a chain of bones, the chain ending behind in the malleus. The sublingual gland is normally developed; the sulcus or depression which is formed in the floor of the primitive mouth so as to cut away the submaxillary gland from the tongue has never opened out. There is in these cases a real condition of tongue tie, the frenum being distended by the glandular mass within it. There is a close relation between these specimens and the cases described by Mr. Barling,[6] Dr. G. W. Griffith,[7] Dr. Kettner,[8] and a case I saw at the London Hospital in a girl aged 2 years. In all of these cases the anterior part of the tongue is imperfectly separated from the floor of the mouth, and in two of them the anterior part of the tongue seemed to be divided, the line of division being occupied by a median mass, which I infer contained muscular and glandular tissue representing submaxillary gland. It is also possible that the median mass may represent the primary element described by His as the tuberculum impar, for Kallius[9] has shown that only a small part of the tongue arises from that element, the major part being formed from lateral elements which grow up from the floor of the mouth and submerge the primitive median element. The fourth specimen on my list (see Table I) is a child in the Museum of St. George's Hospital, which shows a median cleft of the lower lip and jaw, the cleft extending to, and involving, the apex of the tongue.

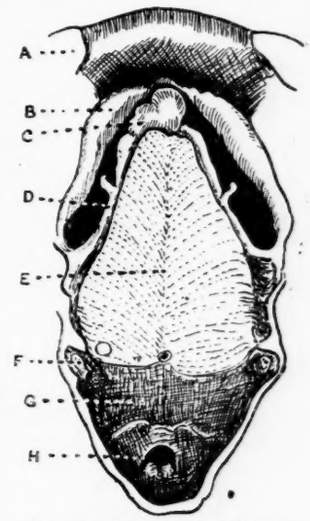


Fig. 25.—Congenital malformation of the tongue. A, Lower lip; B, gums; C, glandular mass distending frenum and extending backwards in paralingual fold (D); E, buccal part of tongue, developed from first arch; F, tonsil; G, pharyngeal part of the tongue, arrested in growth, developed from second and third arches; H, entrance to larynx and rudimentary epiglottis.

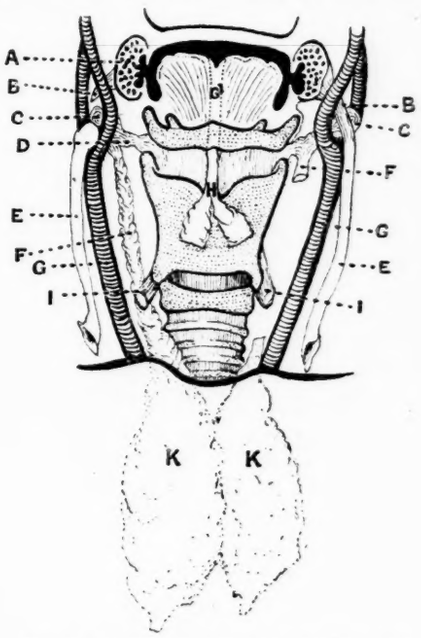


Fig. 26.—Diagram to show the position and connexions of the various embryological remnants in the neck (Dr. S. J. A. Beale). A, Tonsil; B, remnant of tonsillar sac (from second cleft recess); C, carotid body between external and internal carotid arteries; D, stalk of thymus; E, cervical sinus; F, cervical thymus; G, common carotid artery; G, suprahyoid part of median thyroid; H, infrahyoid part of median thyroid, dividing; I, stalk of lateral thyroids; K, K, thymus in thorax.

Sublingual Dermoids.

In the mass of glandular tissue lying by the side of the tongue, in the specimen shown in Fig. 25, there is a small cyst with a lining of mucous stratified epithelium, and in the interior of the cyst, débris of epithelial cells. The cyst has all the characters of a dermoid. I have spoken of the downgrowth of a ledge of epithelium which occurs in the floor of the mouth on each side of the tongue, and thus separates off the submaxillary glandular area. It seems highly probable

that the cyst alluded to above is a product of the paralingual epithelial downgrowth, and that sublingual dermoids are derived from this downgrowth. There are four specimens of sublingual dermoid cysts in the college museum. Such cysts have been fully described by Mr. Butlin[10] and by Dr. Edginton.[11]

Embryological Remnants in the Neck.

Before proceeding to describe the various specimens which represent, or are believed to represent, congenital malformations of the neck, it will be well to enumerate, in the light of recent embryological researches by Hammar[12] and of Henry Fox,[13] the various vestigial structures which may assume a pathological form during the course of development and growth. These elements are shown diagrammatically in Fig. 26. They arise in connexion with the first, second, third, and fourth visceral clefts, the last two being clefts in which gill formations are developed in fishes. From the first cleft arises the median thyroid, the element which forms the isthmus and nearly a half of each lateral lobe of the thyroid in man. The stalk of this element normally disappears, but parts may persist and form tumours or cysts in the line of its formation (Fig. 26). The tonsil is developed at the pharyngeal orifice of the second cleft, but the fundus or outer part of the pocket (see Fig. 26) may persist.[14] In the figure this pocket ought to be shown passing between the lesser and greater horns of the hyoid bone (second and third arches), and ending in the fork between the external and internal carotid arteries. From the third cleft, represented by the thyro-hyoid space, arises the thymus and carotid body; the stalk atrophies in man as far down as the lower pole of the thyroid body, but it may persist, as is normally the case in the pig, and is occasionally the case in newly born children.[15] From the fourth cleft (represented in the interior of the pharynx by the pyriform fossa; see Fig. 27) arises the lateral thyroids and the parathyroids. The stalk of the lateral thyroid buds becomes reduced to a fibrous cord which emerges from the larynx behind the inferior cornu of the thyroid cartilage (Fig. 26, I), and forms in man a firm ligamentous bond (the suspensory ligament) which binds the thyroid body to the cricoid cartilage, but in carnivora, as may be seen in specimens prepared by the prosector of this college (Wm. Pearson) form free fibrous cords. Besides these four endodermal derivates of the visceral clefts—the stalk of the median thyroid, the fundus of the tonsillar clefts, the cervical stalks of the thymus, and the stalks of the lateral thyroids—there is also a fifth element, a derivative of the covering or ectoderm of the embryonic gill area, which may persist and give rise to new formations. That is the cervical sinus (see Fig. 26, E). We see repeated in the human embryo by this sinus, a modification of the gill chambers with which we have long been familiar in the air-breathing fishes—the Dipnoi—and in the more primitive amphibia. In these vertebrates the gill clefts open on the surface of the neck by a common chamber; there is now no doubt that the cervical sinus of the human embryo represents that common gill chamber. During the fourth and fifth weeks the endodermal pockets which give rise to the tonsil, thymus, and lateral thyroids abut on, and are attached to, the fundus of the cervical sinus. The lateral thyroid buds are the first to lose their connexion with the sinus, and the tonsillar pockets the last, because their attachment is the most firm and extensive. There is an especially close connexion between the cervical sinus and the carotid body—a derivative of the third cleft. The fundus of the cervical sinus persists in the mammalian embryo long after its orifice on the neck is closed and in the mammalian embryo becomes a temporary thymus-like body; lymphoid tissue develops in its wall. The question naturally arises: Why is the cervical sinus drawn out into a long fistulous passage (Fig. 26), and why is its orifice on the anterior border of the sterno-mastoid usually near the upper border of the sternum? The answer is to be found in the remarkable change undergone by the neck towards the end of the second month of development. Up to that period, although the cervical part of the spinal column is developed, the chin rests on the breast, the neck being indicated merely by a transverse depression or groove in which the cervical sinus opens on each side (Fig. 28). At the end of the second month and commencement of the third the head becomes extended so that the chin is lifted off the heart and thorax and a neck becomes demarcated. It is not the heart that has receded from the head, but the opposite. If the surface connexion of the cervical sinus has remained unbroken, then the sinus becomes drawn out into a long tubular structure along with the carotid arteries and trachea. The orifice of the sinus usually occurs on the anterior border of the sterno-mastoid an inch or rather more above the sternum, but under certain circumstances the orifice may be drawn up during extension of the neck to occupy a higher position. Cervical appendages occur at the orifice of the sinus.

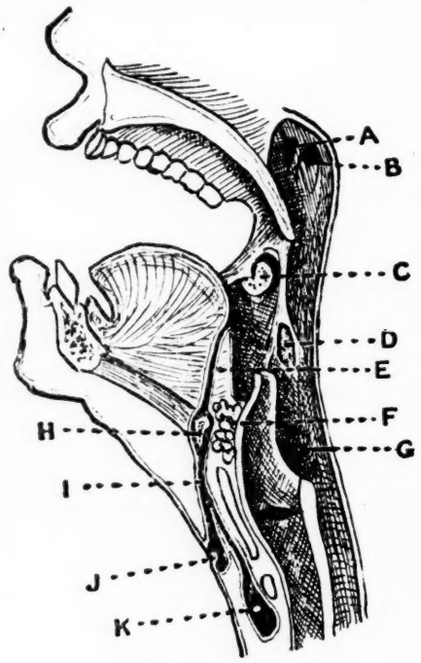


Fig. 27.—Diagram showing the position of the visceral clefts in the human pharynx. A, Eustachian tube (first cleft); B, lateral recess of pharynx; C, tonsil (second cleft); D, position of third cleft, with tonsillar body; E, suprahyoid part of median thyroid stalk; F, retrohyoid mucous glands; G, pyriform fossa (fourth cleft); H, hyoid; I, infrahyoid part of median thyroid stalk; J, right division of median thyroid, forming cyst and fistula; K, left division of median thyroid, forming isthmus.

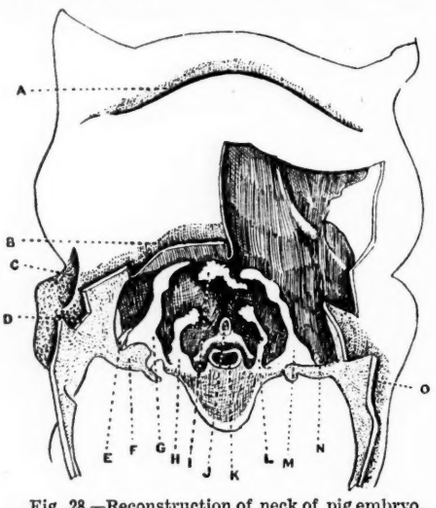


Fig. 28.—Reconstruction of neck of pig embryo, showing the development of the thyroid, thymus, and cervical sinus (after Henry Fox). A, Mouth; B, groove between mandible and thorax; C, external auditory meatus; D, cervical sinus; E, epidermal pocket from cervical sinus to tonsillar recess; F, epidermal pocket to thymus outgrowth; G, M, thymus outgrowths; H, L, lateral thyroids; I, median thyroid; J, trachea; K, oesophagus; N, epidermal process to tonsillar outgrowth; O, cervical sinus.

Cervical Cysts.

There is not, as far as I am aware, a single specimen in metropolitan museums representing a cervical sinus and fistula *in situ*, but, on the other hand, specimens of excised cervical cysts are numerous, two of which are said to have had a fistulous opening. From their structure and relations, it is evident that the majority of these are derived from the cervical sinus. They are sometimes described as dermoids, sometimes as sebaceous cysts, and sometimes as lymphoid cysts. I exclude those cysts which contained grumous matter or blood, because such specimens as have been minutely examined appear to be derivates of the thyroid—cysts formed in aberrant thyroids. Of the eighteen cysts which I regard as derived in part or entirely from

the cervical sinus, twelve are in the college museum. A specimen removed from the neck, opposite the thyroid cartilage, by Sir Felix Semon, may be taken as a typical example. A small bar of cartilage is embedded in its wall—such a cartilage as is occasionally found in the tag at the orifice of the cervical sinus—a product of the operculum which forms the outer wall of the sinus. The cyst is lined by columnar epithelium, similar to that which lines the trachea, but not ciliated. Very little lymphoid tissue is to be found in its wall. The contents are of a milky nature, containing epithelial products. The lining epithelium may be stratified and squamous, or columnar with cilia. Usually these cysts have a close connexion with the carotid sheath, especially near the point of bifurcation of the carotid artery into its internal and external branches. The cervical sinus may fuse and be continuous with the tonsillar recess, so that the cyst wall has both an ectodermal and endodermal lining.

Aberrant Thyroid Tumours and Cysts.

Such tumours and cysts are not well represented in metropolitan medical museums. In the college collection there is a fine specimen presented by Mr. Butlin of a double thyroid tumour, one part of which was removed from the tongue above the hyoid bone; the other part lay below the hyoid. Clearly they were derived from remnants of the median thyroid. Mr. Makins[16] recorded the removal of a thyroid tumour from the posterior part of the tongue in the neighbourhood of the foramen caecum, and recently Dr. Perkins[17] and Dr. T. B. Murphy[18] have been able to bring together about 50 cases of intralingual tumours formed of thyroid tissue, most of them in women. Such tumours frequently occur in the *right* submaxillary region;[19] none are recorded from the same region of the left side. Such tumours apparently represent the right division of the median thyroid. The median thyroids occupy a submaxillary position in the frog. There are two specimens of subhyoid cysts in the college collection, but one of these may be connected with a retrohyoid group of mucous glands which open in the larynx, and were first demonstrated to me by Wm. Pearson, prosector to this college (see Fig. 27). The right division of the median thyroid may be also arrested in development, and form a cyst which afterwards establishes a fistulous opening in the neck.[20] Schrager[21] has recorded 15 cases of cervical cysts derived from the lateral thyroids; they occur beneath the lower third of the sterno-mastoids.

Fig. 29.—Congenital tumour of neck replacing thyroid gland. The right half of the specimen is represented.

Cysts and Tumours connected with the Tonsillar and Thymic Outgrowths.

There are two remarkable specimens in the museum of Guy's Hospital, numbered 499 and 501. In the first specimen, the pharynx of a man suffocated by a foreign body in the pharynx, there is a recess in the position shown in Fig. 27, containing lymphoid tissue—a form of tonsil. The recess represents the inner orifice of the third cleft. In the second specimen (No. 501) a cystic tumour, occupying the subparotid region, opens at this depression; its position and connexion make it clear that this tumour is connected with the stalk of the thymic outgrowth. There is a similar tumour in the museum of the Westminster Hospital medical school. Dermoid cysts found in the anterior mediastinum and in the lower part of the neck may be derived from epidermal inclusions, carried down by the outgrowing buds of the thymus from the cervical sinus.

Congenital Tumours of the Neck.

Altogether I have seen six specimens of congenital tumour of the neck, four of which are in the college museum. In three of these the tumour is median in position, and has expanded into the neck like a huge goitre (Fig. 29), but in the fourth it has developed to the left side, spreading upwards under the ascending ramus of the jaw, zygoma, and temporal fossa, so as to indent the temporal fossa and compress the brain (Fig. 30), and expand the malar and superior maxilla into thin bony plates which cover the tumour. In none of these specimens is any trace of the thyroid to be found; the tumour is the thyroid. On section these tumours are seen to be multiloculated and solid. On microscopic examination they are found to be composed of compressed cysts lined with columnar epithelium. At the bases of the columnar epithelium a layer of lymphoid tissue usually is found; indeed, a large part of the tumour is lymphoid in nature. In the septa between the spaces are found islands of cartilage. How the thyroid body of the fetus comes to assume such a structure and size is an enigma. The tumours resemble congenital sacral tumours, and in many ways have much in common with the tissues which form gills.

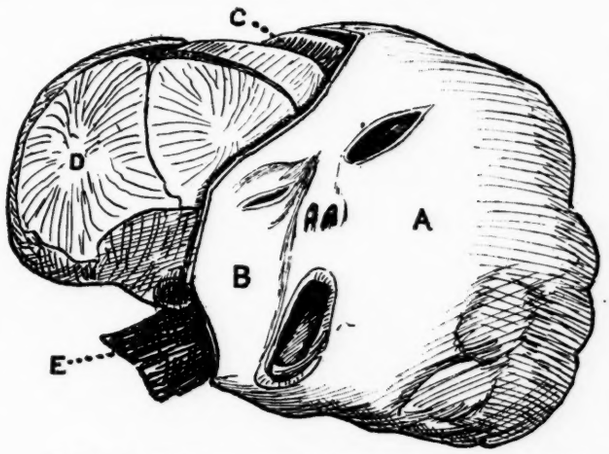


Fig. 30.—Congenital tumour of the neck extending into and filling the left temporal fossa. A, Left cheek in which the malar and superior maxilla are extended as thin bony plates; B, right cheek; C, bony ridge representing temporal crest; E, spinal column and muscles.

REFERENCES.

[1] J. H. Morgan, *Proc. Roy. Med. Chir. Soc.*, London, 1881, vol. ix, p. 94. [2] Edginton, *Glasgow Medical Journal*, May, 1909. [3] Sir James Paget, *Med. Chir. Trans.*, 1878, vol. 61, p. 41. [4] J. Bland-Sutton, *Tumours, Innocent and Malignant*, 4th ed., London, 1906. [5] M. Rieffel, *Bull. et. mém. de la Soc. de Chir.*, 1904, t. xxx, p. 110. [6] Gilbert Barling, BRITISH MEDICAL JOURNAL, 1885, ii, p. 1061. [7] G. W. Griffith, BRITISH MEDICAL JOURNAL, 1899, ii, p. 273. [8] Kettner, *Charité Annalen*, 1907, Bd. 31, p. 400. [9] Kallius, *Verhand. anat. Gesellsch.*, April, 1908. [10] Butlin and Spencer, *Diseases of the Tongue*, 2nd ed., London, 1900. [11] Edginton, BRITISH MEDICAL JOURNAL, 1904, ii, p 808. [12] Hammar, *Anat. Anz.*, 1902, Bd. xxii, p. 221. [13] Henry Fox, *Amer. Journ. of Anat.*, 1908, vol. viii, p. 187. [14] See paper by J. Beccombe Hett, *Lancet*, 1909, i, p. 457. [15] Bishop Harman, *Journ. Anat. and Physiol.*, 1902, vol. xxxvi, p. 47. [16] G. Makins, *Lancet*, December 8th, 1906. [17] C. E. Perkins, *Laryngoscope*, 1908, xviii, p. 293. [18] T. B. Murphy, *Journ. Amer. Med. Assoc.*, 1905, vol. xlv, p. 1854. [19] See Schrager. [20] See C. F. Marshall, *Journ. Anat. and Physiol.*, 1892, vol. xxvi, p. 94. [21] V. L. Schrager, *Surgery, Gynaecology, and Obstetrics*, 1906, vol. iii, p. 465.

UNDER the will of the late Mr. John William Day of Harrogate, Huddersfield Infirmary receives £1,000 for the endowment of a bed, and Harrogate Infirmary a sum of £100.

THE British Association for the Advancement of Science, which this year has gone to Canada, commences its sessions at Winnipeg next Wednesday. The President for the year is Sir Joseph Thomson, F.R.S., Cavendish Professor of Experimental Physics at Cambridge.

LIGHT, PIGMENTATION, AND NEW GROWTH.*

BY

WILFRED WATKINS-PITCHFORD, M.D., F.R.C.S.,

GOVERNMENT PATHOLOGIST, NATAL.

A CELL, or cells, of an otherwise healthy body may give rise, by fission, to "cancerous" progeny.

Cancer appears as an unregulated process of growth, the possibility of which has probably existed from the times of man's earliest ancestors. The process will be most fruitfully investigated when it is considered as one to which the whole community of metazoan life is liable.

Microscopically examined, the initiation of carcinoma proves to be a multiplication of epithelial cells in the *wrong direction*, of sarcoma, an *uncontrolled frequency* in the multiplication of connective tissue cells in all directions. Cancer, therefore, is a misbehaviour of the body cells in their function of multiplication: from the cytological standpoint it may be looked upon as a psychic phenomenon.

From the very dawn of life the cells of the body have been subjected to the discipline of a relatively fixed environment; the suggestion therefore arises that the cytodal misbehaviour indicated by cancer may be the result of some fundamental change in the long accustomed environment of the cells.

Cells from which a malignant new growth may arise have certain common characteristics: (1) Comparatively little morphological differentiation; (2) slight, if any, anatomical connexions with other cells; and (3) the performance of functions associated with frequent multiplication by fission.

Carcinoma and sarcoma appear to be due to one and the same cause. Primary carcinomatous stroma is probably sarcomatous in nature. Although sarcoma may exist independently of carcinoma, yet when it originates in the subcutaneous tissue, it seems to be frequently accompanied by some carcinomatous changes in the adjacent epidermis.

Every normal cell has, from the beginning, inherited certain fundamental physiological peculiarities, and its growth and multiplication by fission are instigated and influenced now as of yore. The activities of the cells of the higher animals are controlled more by the "habits" inherited from former times than by their present environment. These "habits" were originally acquired, and subsequently ingrained, under the compulsion of an environment which has now become so modified as to serve but as a "reminder" of former conditions.

My inference as to the causation of cancer has been drawn from a survey of the phenomena associated with the relations of the animal body to light. No living matter is indifferent to light. Many unicellular organisms, both animal and vegetable, are phototactic. The growing seedlings of the higher plants exhibit a phenomenon (heliotropism) akin to phototaxis, for they bend over towards a source of light in such a manner that their cells multiply towards it. Not only do green—that is, pigmented—plants grow towards the light, but their least differentiated cells—those of the mesophyll—are stimulated to fissional activity by a moderate illumination. If it be admitted that the individual cells which compose the spherical colonies of certain aquatic protozoans are similarly responsive to light—that they divide more freely when illuminated and possess the capacity for phototaxis—then the whole colony, so long as all the members are uniform in their response, will remain symmetrical and will not be heliotropic. If, however, the cells in one region of the surface of such a colony became more pigmented and less phototactic than the remainder, then a "heliotropic axis" would become developed, and the colony would set itself in such a direction as to present the less pigmented, more phototactic, cells towards the light. The result of this change would be that the less pigmented cells would divide more rapidly than, and tend to envelop, their darker and more sheltered neighbours. Such a colony would speedily become unsymmetrical, and would resemble the spheroidal larvae of Sycon and other primitive metazoans, for we find that these consist of a mass of small, colourless cells superimposed upon a few large pigmented cells.

These primitive anatomical peculiarities are found, I believe, in the morula stage of all animals and are even foreshadowed in their germ cells. The mature, impregnated ovum is darker (more pigmented) on one side than the other, and its subsequent segmentation, therefore, results in the appearance of two varieties of cell—light and dark. In all animals above amphibians the lighter cells multiply with relative rapidity and become the ectoderm, the darker cells form the endoderm. I am led to infer from these considerations that the primary cause of the differentiation of the embryonic layers may be an inheritance of those peculiarities of cell-fission which were the result of stimulation by light under the control of pigmentation. I suggest that the original function of pigment in early animal forms was to direct and restrain the fission of the cells; to produce, by originating a heliotropic axis, a more rapid multiplication—in a direction away from their pigmented neighbours—of the cells which become the enveloping ectoderm, whilst affording shelter to those which become the endoderm. A vitally important result of this pigmentary differentiation would be that the cells of the different embryonic layers would respect one another's domains, and thus the "integrity" of the tissues would be secured at the outset. The cells of the higher animals doubtless inherit the habits of orderly growth which were thus acquired by their ancestors.

The phenomena of the internal pigmentation of animals appear hitherto to have escaped inquiry, and may prove to be of deep significance.

The entrance of light into the bodies of the higher animals is very sedulously regulated. I believe that an inverse ratio may be shown to exist between the degree of external protection from light and that of internal pigmentation. Internal pigmentation is evidenced in the endoderm of the more primitive metazoans, and in the mesoderm (an offspring of the endoderm) of all animals, from the mollusca upwards. The blood of the higher vertebrates is a pigmented tissue of mesodermic origin. Among the lower vertebrates (fishes, amphibians, and reptiles) the mesodermic lining of the body cavity is commonly pigmented. This peritoneal pigmentation is almost invariably more marked upon the dorsal side of the sac (that is, towards the direction from which the light usually falls), and varies (inversely) in intensity with the degree of external protection from illumination.

Those regions of the body surface which are not liable to direct illumination do not need to be protected from it, and are therefore comparatively unprotected by pigment or other agency. A difference in the degree of pigmentation of the dorsal and ventral surfaces of the body is usually observed in the higher animals; the exceptions to this rule are in those animals the ventral surface of which is more freely exposed to light than in others.

I contend that the external pigmentation of animals is, primarily, but one of several agencies serving to protect the enclosed tissues from excess of illumination, that the pigmentation of certain internal tissues assists in controlling and directing the multiplication of those cells which habitually undergo fission, and that the "intention" of the particular colour selected for the blood of the higher vertebrates is similar to that with which we make use of ruby glass in the window of a photographic dark room.

The favourite colour scheme of the animal kingdom comprises that which will best arrest the more actinic rays of the sunlight, and is represented by the series black, brown, red, orange and yellow. This scheme is reproduced, in miniature, in the races of mankind—with the striking exception of the white man.

The production of pigment in response to increase of illumination is a vital and not a physical process, and is probably an inherent reaction to provide against some consequence dangerous to the organism.

Reflecting and dispersing surfaces, pigment, scales, feathers, hair, posture of body, and light-avoiding habits are among the agencies which protect the tissues of the animal body from excess of illumination. The protecting agencies in man are limited to the pigmentation of his skin. His erect attitude causes him to present the ventral surface—which has for countless ages been directed downwards—to direct illumination. In the matter of protection from light man stands isolated in the domain of biology. The white man is the last link in a chain, almost interminable in length, of pigment-controlled and pigment-

* An abstract of "An Essay on Cancer" to be communicated to the South African Medical Congress, August, 1909.

protected creatures, and—without hairy coat and without colour—he is fitted only for a nocturnal existence. It seems probable that no other animal in its natural state exposes its body so constantly to bright daylight and direct sunlight as does civilized man.

The cells of the body possess peculiarities which, for want of a better term, must be called psychic. They possess the "instinct" for orderly multiplication, and behave "instinctively" as their ancestors behaved. The direction of multiplication of epithelial cells was originally and for many ages dictated by the presence of pigment; the habit of multiplying away from the site of pigment, or away from connective tissue cells, has now become a very stable characteristic of epithelium. The protection afforded in past times against actinic stimulation has established a very firm habit of leisurely and orderly multiplication in the connective tissue cells. The traces of pigment in the dermis and epidermis of the white man, and the basement membranes of epithelial structures, probably perform a mnemonic function and serve to "remind" the cells of former conditions. The "physiological resistance" of tissues hypothecated by Cohnheim is identical with this principle of cell instinct for direction of multiplication.

We may look to find a relative increase of liability to cancer associated with a relative decrease in pigmentation.

My main proposition is that cancer is the result of the loss by the cell of its "instinct" for orderliness in multiplication, and that this "psychosis" of the cell is usually consequent upon undue actinic stimulation.

The relative frequency of sarcoma, as compared with carcinoma, in early life is an ontogenetic reproduction of a phylogenetic peculiarity.

To the penetration and stimulation of the tissues by radiant energy we shall apply the term "irradiation." The liability of an organ or region to be affected by cancer is in proportion to its liability to irradiation. Organs and regions (such as the superficial portion of the parotid and the dorsum of the trunk) which have been, in past ages, continuously liable to irradiation have acquired a partial immunity to cancer. This partial immunity is usually signalized by "latent malignancy" and chronicity of the process. Those organs which are best protected from irradiation are the least liable to cancer; those which were formerly well-protected and are now exposed are the most liable.

Mammary cancer in the woman is usually due to deficient protection of the breasts from light.

The specially frequent localization of cancer in those median pelvic structures which lie immediately behind and below the base of the bladder may be due to the dioptric effect of this organ, when distended, upon actinic rays penetrating the anterior abdominal wall. The light which can so penetrate must be (1) small in amount, (2) in excess of that to which the abdominal contents have been accustomed in all former states, and (3) although invisible, must yet, like visible light, be amenable to concentration in certain localities by spherical refraction.

The selection of the pyloric region of the stomach may be due to the fact that, when the organ is distended with gas, a large portion of this region is in close contact with the abdominal wall in the subcostal angle.

The face, being the most continuously illuminated region of the body, is specially liable to be affected. The marked predilection shown by rodent ulcer for a certain locality may be accounted for by a "retro-illumination" of the skin of this region by light reflected from the globe of the eye, and also transmitted through subjacent sinuses by trans-illumination. The relative frequency with which the lower eyelid and the lower lip are affected may be associated with the relatively greater protection of the upper. The "kangra" cancer of the Kashmiri is due to direct irradiation from an artificial source of light and heat.

The cell's environment usually requires very prolonged illumination from natural sources before the stability of its "instinct" is threatened.

External cancer originates, by preference, at or near the junction of unpigmented with pigmented surfaces, or at the junction of less with more pigmented surfaces, the difference in the degree of pigmentation being evident either in the individual affected or in his near ancestors. "Cell-instinct" is probably least stable in such border zones.

The relative immunity of transparent epithelial structures, such as the cornea, lens, and mucous lining of the trachea, may be due to the fact that a transparent substance arrests no light, and is not, therefore, affected by illumination in the manner in which translucent and opaque substances are.

The occurrence of subcutaneous (melanotic) sarcoma near the finger-nail or toenail of the white man is explained by reference to the pigmentation of the digits of the negro—in the latter we find that this region is a border zone between pigmented and unpigmented regions. Subcutaneous sarcoma has been observed with marked frequency upon the heel and the borders of the foot of the uncivilized negro. These regions are unprotected by pigment and are border zones.

The liability of the kidneys to cancer during infancy is perhaps due to the relative thinness of the posterior parietes at this period of life, and also to the fact that the characteristic attitude of infancy is the crawling one.

The preference shown by sarcoma for the femur and the neighbourhood of the knee-joint is probably due to the fact that of all regions of the limbs this one has experienced the greatest increase in illumination by the assumption of the erect attitude.

Congenital cancer, sarcoma of the placenta, and deciduoma malignum appear to be consequent upon irradiation of the gravid uterus and its contents.

The increased liability to cancer with advancing years may be due to the final yielding of the cells to long-continued stress of environment, to general depreciation of psychic peculiarities (including cell instincts), and to reduction in the agencies of protection—pigment and hair.

The essence of racial liability appears to be degree of deprivation of pigment. If the races of mankind be graded upon a basis of colour, the relative liability of any one race is represented by its position in the scale.

Cancer has been found to be slightly more prevalent among those who are the more exposed to actinic stimulation—seamen, dwellers beside lakes and rivers, agricultural labourers, masons, etc.

Cancer houses usually appear to be unwholesome dwellings, often affording special facilities in their immediate neighbourhood for the irradiation of their anaemic inhabitants.

The increase of cancer within the last seventy-five years is perhaps due to diminished protection from light and increased exposure to illumination. Woollen garments have been largely replaced by cotton, and black and brown clothes by those of a light colour. Narrow streets and dark houses are no longer tolerated, and suburban life has largely replaced that of the city. Artificial illumination has become greatly more actinic in its character. The habit of snuffing has yielded to the vastly more prevalent usage of smoking tobacco by means of a pipe.

A manifest deduction from the principles we have advanced is that cancer may be prevented by efficient protection of the body from light. Natural protections, such as hair upon face, to be encouraged. The clothing to be absolutely light-proof. The ventral surface of the thorax and abdomen to be specially protected. The tobacco pipe to be discarded at 35.

The essential difference between a simple (pathological) hyperplasia and a malignant hyperplasia is perhaps a psychic one—a question of inheritance or non-inheritance of orderly instincts by the principal actors. The sites of selection by cancer are also common sites for simple hyperplastic lesions. Prevention of irradiation may possibly obviate both disorders.

THE *Liverpool Daily Post* calls attention to the fact that at the recent assizes in that city, in one of the cases heard in which medical evidence was required, three medical men in succession requested to have the oath administered in the Scottish way. Our contemporary calls attention to the fact that, on the motion of Mr. Frederick Lowndes, the Liverpool Medical Institution some time ago passed a resolution condemning the insanitary, and in many cases dangerous, custom of kissing the book, and adds: "The change is a very desirable one, and if the medical men themselves practise what they preach, the thinking portion of the community will not be long in following their example."

SEVENTY-SEVENTH ANNUAL MEETING
OF THE
British Medical Association.

Held at Belfast on July 23rd, 24th, 26th, 27th, 28th, 29th, and 30th.

PROCEEDINGS OF SECTIONS.

SECTION OF DERMATOLOGY AND ELECTRO-THERAPEUTICS.

William Calwell, M.A., M.D., President.

PRESIDENT'S INTRODUCTORY REMARKS.

Gentlemen,—Allow me on behalf of my colleagues and of myself to offer this Section a hearty welcome to Belfast.

The few minutes during which your patience will be imposed upon I shall devote to a very brief outline of the rise of dermatology in its medical school. Up to the present, it might not inaptly be termed the Cinderella of the specialities, except that, unlike her prototype in the fairy tale, she has been denied the duster and the broom. Ringworm and impetigo are, I am afraid, unduly common in some of our national schools, and would be more so were it not for the intelligence of the schoolmaster. If, however, a somewhat superior air is meted out to dermatology, the ancillary science of electro-physics is feared as *un enfant terrible*, who keeps us in constant suspense as to what undreamt-of family skeleton he may reveal, or what uncanny prank he may play on our too sensitive tissues.

In 1865, the late Dr. H. S. Purdon instituted a small skin dispensary. In 1875, the Benn Hospital for Skin Diseases was built and partially endowed by one of Belfast's early philanthropists, whose name it bears, and Dr. Purdon was put in charge; he continued to execute the duties of Visiting Physician till 1896. Although both the Benn Skin Hospital and the Benn Eye, Ear, and Throat Hospital lay side by side, and both were within little more than a stone's throw from the old Royal Hospital, the clinical hospital of the day, they did not discharge the second great function of a hospital, the teaching of the medical student. The late Dr. McKeown had frequent visitors, graduates and undergraduates, to his eye clinics, and classes of the latter for some years, yet steady, systematic teaching cannot be considered a prominent feature in the history of either hospital. In 1896 Dr. Purdon was appointed Consulting Physician, and his son, Dr. E. B. Purdon, and Dr. Allworthy, who had acted as assistants for three years, were appointed Visiting Physicians. Further improvements have been made, an *x*-ray department fitted up, and the work of the institution is known and appreciated throughout Ulster.

When Physician to the Ulster Hospital for Children I devoted one day in the week in the extern department to patients suffering from skin diseases; and when I became assistant physician to the Royal Hospital I pursued the same policy. In 1903, on the recommendation of the medical staff, our board of management gave its imprimatur to the formation of an out-patient skin department; and in the same year, partly as physician in charge of this department, partly as honorary secretary of the staff, it fell to my lot to organize a Finsen light, Roentgen ray, photographic, and general electric department. Owing to multiplicity of duties, it was quite impossible for me to attempt to work it personally, and Dr. Rankin was invested with the responsibility. I need not say the choice has been more than justified; the original accommodation has already become utterly inadequate, and efforts are being made to obtain more ample space. Dr. Rankin is associated with Dr. Houston in a vaccine department, so that patients have the benefit of both these latest results of science. Some little time ago a public-minded citizen, Sir Otto Jaffé, presented to our college some radium; it was, however, in tube form, and so was unsuitable for clinical work.

In the Mater Infirmorum Hospital, which was rebuilt in 1900, a Roentgen ray equipment has been lately established and put under the charge of Dr. O'Doherty, who is already turning out admirable work.

In the Queen's College no special course of skin diseases was held; but in our Royal Victoria Hospital I gave an informal series of lectures during the summer session, and clinical teaching is carried on both winter and summer.

Inspired by the precepts and example of that veteran in dermatology, Sir Jonathan Hutchinson, I have for many years been making additions from the various publications to a private collection of illustrations, chiefly of skin diseases, but also of rare or typical pathological states that lend themselves to portrayal. These have now become as a private collection unwieldy from numbers; but through the kindness of our local Division, which has supplied two handsome cabinets, and of the Ulster Medical Society, which has undertaken to house them, a beginning of a pictorial museum has been made, which will be available for consultation to the medical men in the North of Ireland. To a Dermatological Section I need not advocate the advantages of such an institution. But as the collection has passed from private hands I do not, even at this early stage, hesitate to appear before you as a beggar and crave such duplicate illustrations as may be lying superfluous on your shelves. I shall personally for some time longer be engaged in the reclassification and cataloguing of the present collection, which I had allowed to lapse, and shall see that any contribution is fully acknowledged; and if already in hand promptly returned or exchanged for specimens that are missing.

In these revolutionary and evolutionary days the pertinent question may be asked, Does dermatology obtain its proper place in the education of the medical student? At present it comes as a hurried and scamped course at the end of the curriculum. This to my mind is a mistake, and is a remnant of the ignorance of the profession in times past in this class of disease. While we are teaching the student medical and surgical anatomy, while we are training his observation and the manipulative art of elementary surgery, could there be any better education in observation, in watching the change of disease, in taking note of the effects of remedies, than the study of dermatology, where everything lies open and clear before the observer? Therapeutic investigation is the most difficult of all investigations; estimation of results is practically impossible to the student, except as in skin diseases, where even patients can form a correct opinion of the value of our measures. Would not a student have a better idea of pulmonary tuberculosis if he had seen the several varieties of lupus—lupus with secondary infection, lupus with fibroid thickening, lupus with its scars and puckerings? The application of radium, of Finsen light or of Roentgen rays, the injection of tuberculin, would teach a student that treatment does not consist in writing a prescription or by force removing from sight the external diseased tissue. Does not the study of that large class of disease labelled "eczema" give an insight into gastro-intestinal infections? I might mention many other examples; these will suffice to suggest the idea. I have been convinced now for many years that a course of elementary dermatology would constitute a valuable training for the student preparing for ward work.

DISCUSSION ON RADIUM AND RADIOTHERAPY IN SKIN DISEASE.*

OPENING PAPER.

M. le Dr. Louis Wickham,
Medical Superintendent of the Radium Institute, Paris.

Permit me, first of all, to offer my sincere thanks to the committee of the Section for the honour done to me by its invitation to speak on radium treatment. I should like to say that, if I have been able to make a little progress in this branch of physio-therapeutics, it is only due to my

* In the course of his paper Dr. Wickham gave a lantern demonstration, showing a large number of cases before, during, and after radium treatment. He also exhibited his apparatus, the filters of different substances and thicknesses which he commonly uses, and samples of radiferous materials, and of the ores from which radium is extracted.

good fortune in having had a large quantity of radium, together with improved apparatus, put at my disposal, and that, moreover, I am not forgetful of the excellent work done by earlier investigators and by my collaborators at the French Institute of Radium, which was founded in June, 1906, as the consequence of my previous work.

I will first touch on the subject of instrumentation, and you will then see wherein its improvement lies.

Amongst the earlier instruments, there is one that can still be utilized with great advantage, although it no longer plays its original, almost unique, rôle. It is here: this glass tube containing grains of radium, loosely piled like grains of corn in a sack.

A simple apparatus like this is of great service, though its application is limited. It can be introduced into passages, fistulae, and natural or artificial orifices. For example, in the treatment of cancer of the rectum and of the prostate, the radium tube can be introduced into a catheter, which conveys it to the desired point. In the treatment of cancer of the intestines which is sufficiently accessible, I have profited in several cases by the orifice of an artificial anus. In the same fashion can be treated a tumour of the bladder or a cancer of the pylorus.

In short these tubes are useful in applying radium locally and to a limited surface, but not when it is desired to expose every part of a surface to radium action of precisely corresponding intensity. Such action is secured by the varnish apparatus, of which I will now speak. It was in March, 1905, that I used these for the first time. It will be observed that in these the radium grains are no longer loose, as in the tubes, but definitely fixed by varnish. There are two sorts of varnish apparatus: the rigid, formed by a metallic base, and the flexible, formed by a linen base; this we call in French "Appareil toile," or "Toiles radifères." They are especially useful in dermatology, in the treatment of skin disease, where the homogeneity of action to which reference has been made is necessary. It is quite easy to adapt these rigid and flexible applicators to any region. They can be made round, square, cylindrical, and placed alongside one another, or over one another as one pleases, so as to multiply their activity. Here, for instance, is a flexible applicator which will cover either a concave or convex region, for instance, the neck of the uterus. This other flat form is very useful for treating the conjunctiva by slipping it under the eyelid. This cylindrical form is useful for inserting into cavities, and for this purpose superior to the glass tubes, when, as in treating metritis, homogeneity of action is essential. Equal distribution of the granules of radium in these applicators is of course a point of the highest importance in their manufacture; in default thereof the desired homogeneity of action will be lacking and prove highly prejudical to treatment.

FILTRATION.

Now that we know something about the form and the construction of the apparatus, let us see how the various rays emitted by them may be employed.

If nothing more were possible than utilization of the radiations exactly as they are emitted from an apparatus, their uses would be restricted; but fortunately they may be modified indefinitely.

This is done by filtering them through screens, and such filtration has completely changed the position and future of radium therapeutics. From the physical point of view filtration has been studied ever since the first discovery of radium by Pierre Curie and Madame Curie, and attempts have been made to differentiate the rays. In March, 1905, I was dealing with an apparatus giving a great number of rays of high activity, and realized the necessity of finding some means of changing the quantity and the quality of the rays emitted from one and the same apparatus. With this end in view I at first interposed, between the apparatus and the diseased parts, a wad of cotton-wool, tightly pressed together, and tied up with some gold-beaters' skin. These wads were of different thicknesses, according to the modifications which it was necessary to bring about in the radiations. Later on I tried sheets of aluminium, and then in January, 1907, when working with Dr. Degrais, I employed for the first time as a filter a sheet of lead of $1\frac{1}{4}$ mm. thickness covered with indiarubber, which gave a screen of great thickness allowing only gamma rays to pass.

A little later the chief of the laboratory of physics at the French Institute, M. Beaudoin, studied methodically the measurement of the radiations passing through a series of filters of aluminium of a thickness of 1 to 10 hundredths of a millimetre, and through filters of lead of a thickness of $\frac{1}{10}$ mm. to $\frac{5}{10}$ mm., and also those of a thickness of 1, 2, and 3 mm. Dr. Dominici, my colleague at the Radium Institute, availed himself of these researches for studying the therapeutical effects of gamma rays isolated by thick filters of lead, and thus has helped forward in that direction the progress of radium therapeutics.

I too, with Dr. Degrais, utilized these researches, and studied not only the very thick filters, but also the thin ones and those of medium thickness, especially those of $\frac{1}{10}$ mm. to $\frac{5}{10}$ mm. of lead, which permit the passage of the hard beta rays as well as the gamma rays. These I frequently find of exceeding use, specially if they are utilized by the method of cross-fire.

On account of the importance of this question of filtration it is necessary for me to dwell on it a little. What I wish, above all, to render clear is the utility and *raison d'être* of filtration. Every one knows that the rays emitted from radium are of three different groups—(*a*) the alpha rays, (*b*) the beta rays, (*c*) the gamma rays—and that the beta rays themselves are divided into the soft beta, medium beta, and hard beta. You will also remember that the alpha rays have very weak penetrative powers, and that very few of them are capable of being emitted by the varnish apparatus.

The beta rays have greater and greater penetrative power, ranging from the soft ones, which are the least penetrative, to the hard ones, which possess a very high power of penetration, and these beta rays are emitted through the varnish in an overwhelming preponderance, averaging from 80 to 90 per cent. of the whole. The gamma rays have considerable penetrative power; but they are in very small proportion, only about 2 to 10 per cent.

These facts once appreciated, it will be easy to understand that the radiation emitted by a naked varnish apparatus can, by the interposition of screens of increasing grades of thickness, be modified in two ways: (1) in point of quantity; (2) in point of quality. This needs, perhaps, a little explaining.

How is it possible to modify quantity?

As screen after screen of increasing grades of thickness and density is interposed, first the alpha and soft beta rays will be cut off and absorbed, then the medium beta, then the hard beta; thus in each case the number of rays having the power to filter through the screens is in decreasing quantity.

Secondly, how is it possible to modify quality?

As screen after screen of increasing grades of thickness and density is interposed, the rays in proportion to their number will have greater and greater powers of penetration; thus the quality of the radiation is changed, because the average of its penetrative power is increased.

Let us now see what advantage can be drawn from this knowledge for therapeutical purposes.

As the rays diminish in number in proportion as the screens increase in thickness, it is easy to understand that the duration of the applications must play a very considerable part, and that this duration must be increased in length in proportion as the rays are diminished in number and from this fact the following three general rules of treatment can be deduced:

1. Apparatus applied naked. Rays numerous; special action on the surface; duration of application short.

2. Apparatus with interposition of medium filter. Rays less numerous; action on a greater thickness of tissue; duration of application longer.

3. Apparatus with interposition of thick filter. Rays very few; action on a very great depth of tissue; duration of application very long.

I illustrate the application of each of these general rules or formulae.

My first case is one of lichenoid eczema.

Here the lesions are superficial and sensitive. In accordance with the formula, I employed (without a screen) a powerful apparatus, radiating an activity of

500,000. Treatment was in one series, and lasted but a very short time—in all from ten to twelve minutes; these twelve minutes were given three minutes at a time, and were spread over a period of four consecutive days.

The result was very distinct; the itchings ceased, the inflamed cells were modified, and at the end of the third week there remained nothing. This cure took place two years ago, and there has never been any relapse.

Now for the second formula. Here is a case of superficial cancer of the forehead of somewhat large extent, where it was necessary to act on rather more deeply seated tissues. I again employed an apparatus radiating 500,000, but interposed a filter of $\frac{1}{10}$ mm. of lead in order to have only a few medium beta rays, hard beta rays, and gamma rays. The duration of the application was fifteen hours, or one hour each day for fifteen successive days. The cure took place very rapidly, and nine weeks after the completion of the applications nothing remained but tissues of good appearance.

Fig. 1.—Acne keloid of the neck, ameliorated by radium therapy. Taken from *Radiumtherapie*, by Wickham and Degrais (Baillière et Fils), shortly to be published in English.

Here is now a case to illustrate the third formula. This was one of cancer of the glands of the neck, which, having spread and formed a large mass under the skin, remained intact, and made it necessary to act not on the superficial but on the deep-seated tissues. The same apparatus, radiating 500,000, was covered with a screen of 3 mm. of lead, and was applied for a hundred hours on three places in periods of ten hours. The apparatus was applied at night and taken off the next morning. The tumour has greatly diminished, and this work of amelioration was carried on underneath the surface without destroying or even affecting it.

It is thus possible by means of the screens to regulate the dosage in such a way as to act on the tissues at different depths. It must be noticed also what an important part is played by the duration of the applications.

When once the apparatus, the screen, and the dosage have been chosen, the duration of the applications depends on the reaction which it is desired to obtain, and whether or not it is necessary to produce a simple modification of the tissues without causing any inflammation, or, on the contrary, to obtain their inflammation and destruction. In deciding these points, it must be borne in mind that there are some pathological tissues on which radium has a specific action, and that to modify them the production of inflammatory reaction is unnecessary. For example, many forms of cancer, of mycosis fungoides, of lymphosarcoma, angioma, keloids, and chronic eczemas can be favourably influenced without being inflamed. On these lesions radium has a specific action, and this partly explains how it is possible to obtain an action on the deep-seated tissues without affecting the skin, as in the case of a cancer of the breast, or subcutaneous angioma.

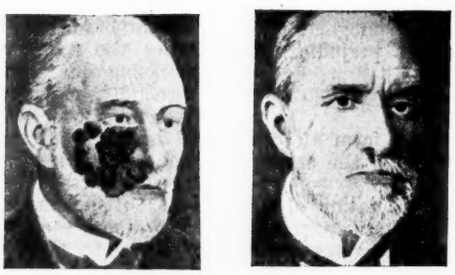


Fig. 2.—Elevated angioma, cured by radium therapy. Taken from *Radiumtherapie*, by Wickham and Degrais (Baillière et Fils).

For many other pathological tissues there is no hope of modification except by inflaming or by destroying them. The pigmentary naevi furnish an example of this. Certain pathological tissues, moreover — for example, cancer of the skin—though capable of being cured without any inflammatory reaction, are more quickly and more easily cured by destroying, not modifying, them.

Now, what must be done when it is desirable to create an inflammatory and destructive reaction? Simply prolong the duration of the applications. We can consequently return to our three rules, and apply them to destructive purposes, by making the applications of greater duration.

By the first formula we can destroy superficial lesions such as pigmented naevi, or superficial cancer.

By the second formula we can destroy a thicker layer of tissue, and by the third formula we can destroy the deep-seated tissues, but in this last case it is obvious that the skin will be affected during the process of destruction.

ILLUSTRATIONS OF FILTRATION.

Thus diverse are the technique and the methods; and it would be wrong to adopt any single method of filtration, whether that by thick screens or that by light screens. Each kind has its own therapeutical importance, and it is necessary to know, not only how to use all the different methods of filtration, but how to obtain from each one the desired result. Here is an example which proves the multiplicity of methods that can be employed in one and the same case.

This wax model represents an enormous cancer situated under the skin, and having its origin probably in the parotid gland. This tumour was as hard as plaster, and immovable. The skin covering it was everywhere intact, excepting at one point. I adopted for this case three different methods:

1. I applied to the ulcerated part an unscreened varnish apparatus which I left long enough to produce violent destructive effects.

2. I introduced a tube deep into the interior of the tumour by making a cavity in the middle of the ulceration.

3. On the surface where the skin was still intact I employed for many hours an apparatus covered with screens 2 mm. and 3 mm. thick, so as to protect the skin, and to act on the deep-seated tissues; these apparatus were applied opposite one another, so as to produce the cross-fire, which is a method I will speak of later on.

Up to this point we have discussed the apparatus and the ways of modifying the rays emitted; now let us see how to apply the apparatus. One point to bear in mind is the necessity of the operator avoiding radium dermatitis. For the rest, the mechanical utilization of the apparatus is easy. It can either be held in the hand, or fixed by pincers, or by bandages, and I have already spoken of the way of using the applicators in viscera.

Another point to remember is that, when using the rigid metallic applicator, it must not be allowed to come into immediate contact with the lesion which is being treated. The rays as they pass through metallic substances produce, as M. Sagnac, Professor at the Sorbonne, demonstrated, secondary rays very slightly penetrative, and cause irritation. They must be cut off by placing five to ten sheets of black paper under the metallic screen (this was suggested to me by M. Sagnac and M. Beaudoin); then apparatus, screen, and paper are kept together and protected by a covering of indiarubber.

RADIFEROUS SUBSTANCES.

Before mentioning the results I have obtained, I should speak of emanation.

Radium furnishes, in addition to its rays, a gas, called emanation, which we have often utilized. It can be used in a free state or incorporated in diverse substances.

I show now Armet de Lisle's apparatus used for obtaining it. A solution of radium is placed in a horizontal tube, so as only to fill half of it; in the upper half of the tube the gas emanation accumulates. By blowing, this gas can be expelled and enclosed in a receptacle, from which it can be extracted as it is wanted. Here is another apparatus for concentrating the gas emanation by means of liquid

air. In the lower reservoir of the apparatus is the substance on which we wish to concentrate the gas. After having introduced the emanation into the upper reservoir, the lower reservoir is plunged into liquid air, and immediately the emanation concentrates itself on the substance contained in the reservoir.

As you see, substances can be rendered rich in emanation by being thus brought into contact with the emanation itself. But there is another method, which consists in incorporating the substances with soluble or insoluble salts of radium.

It is pleasant to me at this point to recall the fine work of M. Jaboin, our chemist at the French Institute of Radium, who has succeeded in rendering a whole series of substances radiferous, in the desired proportions, and according to prescribed dosages. These include radiferous quinine at a degree of half a microgram, that is to say, half a thousandth of a milligram of pure radium, for 0.20 of quinine. There is also some radiferous mercury, and some other substances. The quantity of radium is, of course, very small; but, at any rate, it is greater than in the radio-active natural waters.

Fig. 3.—Cancer (tuberous) behind the ear, healed by radium therapy. Taken from *Radiumtherapie*, by Wickham and Degrais (Baillière et Fils).

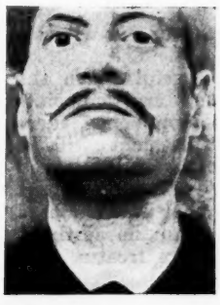
All these substances have been used for some time, and are perfectly well supported by the organism. In my work at the Hospital at St. Lazare, I have made a certain number of injections of radio-active grey oil and iodide of mercury, and the urine after each injection shows radio-activity.

Similarly, MM. Jaboin and Beaudoin have managed to incorporate with Bussang thermal water the exact quantity of radio-activity which exists in it at the moment that it bubbles out of the earth. The water thus rendered radio-active again can be transported without loss of its power. In all originally radio-active thermal water this quality can now be rendered permanent, instead of being lost as soon as the water leaves the ground. And I am of opinion that the radio-active bath may be of great help in general diseases of the skin.

A radiferous substance, which has been of service to me, and which M. Jaboin prepared after my advice and at my instigation, is a hard vaseline, rendered radiferous. This I inject under new growths, and by applying radium on the external surface at the same time I produce, by the double action, what I have called cross-fire.

The radium I use is extracted at the works of M. Armet de Lisle, near Paris, under the direction of M. Danne, an assistant of M. Curie; Madame Curie herself carries on some of her researches at this manufactory.

The ores from which the radium is extracted include an oxide of uranium, called pitchblende or pechurene; double phosphate of uranium, called uranite or autunite; double phosphate of uranium and of copper, called chalcolite; a vanadate of uranium, called carnotite; an oxide of uranium and of thorium, called thorianite.



g. 4.—Cancer in large glands of the neck, cured by radium.

These different ores come from beds which exist in Portugal, Saxony, Ceylon, and the United States, and are found in great abundance in France in three different localities: near Autun, whence the name autunite; in the province of Auvergne; and in the department of Saone et Loire, near Issy l'Evèque. They are also found in the colony of Tonkin.

The extraction of even a small quantity of radium needs considerable work. In order to obtain 2 to 5 cg. of pure bromide of radium, it is necessary to stir together 50,000 kg. of water, 5,000 kg. of chemical products, and 1,000 kg. of ore. The products obtained are then broken into fragments until the salt obtained can be recognized as pure. This is done either by means of the spectroscope or by means of Curie's electrometer. I have mentioned an activity of 100,000 and 500,000, and it is perhaps well at this point to explain what is meant by these numbers.

By the electrometer the radium is recognized as pure when it has an activity about 2,000,000 times greater than that of uranium, which is taken as the unit of measure. To diminish the force of the activity it is mixed with bromide of barium. Thus to have radium salts of an activity of 1,000,000—that is, half of the pure—it is mixed in equal quantities; for salts of 500,000—that is, a quarter of the pure—there must be three parts of barium for one of radium; and so on for all the other mixtures. Hence, when speaking of an apparatus, I say that it contains 20 cg. of radium at 500,000, it means that that apparatus contains a mixture of 5 cg. of pure radium and 15 cg. of bromide of barium. When I say that a radiation emitted through such and such a filter will be of an activity of 10,000, that will mean that that activity is 10,000 times greater than the activity of an equal quantity of uranium spread on an equal surface.

THERAPEUTIC RESULTS.

We are now prepared to follow, not only the clinical results that I have obtained, but also the working processes and the dosages that I have employed. But you must understand that in all the theory just passed in review I have only been able to give you certain indications, signposts, formulae, taken as types, and it is obvious that amongst these types and formulae there will be room for numerous intermediate formulae, and also for numerous exceptions. Certainly in radium therapeutics, as in everything else, side by side with the rule, there is room for the experience, the knowledge, and the sagacity of those who use radium. For radium is a double-edged weapon—well employed, it can render great services; badly employed, it may cause burns, excite or develop the pathological tissues, leave ugly scars, or cause blanching, telangiectatic scars, real naevi, and pigmentations.

I will pass in review the various groups of maladies that have been treated, and of which I have slides, leaving aside others, such as cancer of the breast, and deep visceral cancers, such as diseases of the uterus.

Let us first take cancers of the skin:

CASE I.

Here is a case of exuberant epithelioma of the temple, and the four stages of its regression. This neoplasia was treated for ten hours with a varnish applicator applied naked, and giving radiations of an activity of 55,000, composed of 2 per cent. of alpha, 85 per cent. of beta, and 13 per cent. of gamma rays. Each day the patient received one hour's application. The regression was very rapid. The second photograph shows the tumour twelve days after; the third, twelve days after the second. The last is the healed skin, which has remained intact and healthy for three years.

CASE II.

Here is an enormous epitheliomatous cauliflower tumour on which, on three different places, and for the period of one hundred hours on each place, was applied a very weak radiation of an activity of about 2,000, but composed of what I with Dr. Degrais call *rayonnements surpénétrants*—that is, selected rays of an exceedingly high penetrating power. The screen interposed was 2 mm. thick. The apparatus employed was a radiferous linen containing 0.06 of radium of an activity of 500,000. Here the dosage was very strong; nevertheless, not the slightest inflammation was produced, the tumour simply receding.

CASE III.

My next is a case of ulceration of rapid evolution and malignant form. We applied during ten hours, one hour a day, an apparatus radiating 55,000, composed of 0 per cent. alpha, 90 per cent. beta, and 10 per cent. gamma rays, and covered by a screen of aluminium $\frac{1}{100}$ mm. thick. There was produced an inflammatory reaction and the formation of a crust, which at the end of two months came off, leaving the skin intact and healthy.

Here are some general rules which I might mention for treating cancer of the skin:

If the lesion be torpid, of non-malignant appearance and of small size, the very light filters can be used; a radiation of 50,000, composed of all the beta and the gamma rays, applied from two to four hours will suffice.

If the lesions be acute, with the periphery inflamed—in short, malignant, and of bad appearance—I prefer to treat them gently and cautiously by interspaced applications. The filters of $\frac{3}{10}$ and $\frac{4}{10}$ mm. of lead must be used, and act from twenty to thirty hours with a radiation of about 20,000, composed of "*rayonnements surpénétrants*," the hard beta and gamma, with a majority of the former.

If the lesion be very deeply spreading, and the cancer under the skin is to be treated, and the skin in that case at the same time protected, it is still more necessary to choose very powerful apparatus, covering them with from 3 to 4 mm. of lead, so as to have only very deeply penetrative gamma rays, forming an activity of not more than 2,000 to 3,000.

Each application is from ten to twelve hours. It is made during the night, and renewed every other night. After ten to twelve applications they must be stopped for from three to four weeks, and a second series then commenced.

I show two cases of leukoplakia, which greatly benefited by the treatment, but I must mention that in some cases the leucoplakia returned after a certain time. They were treated with very light filtering and short applications of ten minutes' duration, repeated ten times.

I will now show some of my keloid cases. Keloid tissue is exceedingly good ground for radium to work on. A keloid can be cured and the base of the tissues even rendered sufficiently supple to enable the skin to be easily wrinkled, without, at any moment, the slightest inflammation of the skin being produced. But in certain cases the keloid can, without any risk, be inflamed and destroyed. Indeed, it is exceedingly interesting that, when inflammation has been induced by radium, it occasions no injurious excitement, but, on the contrary, the keloid wears away at the same time as the induced inflammation weakens. I have some cases which have never suffered any relapse, although of distant date. I show here a case of keloid in the neck, and I may explain how I should treat such a case. I should take an apparatus of 500,000 activity, of large size, so as to cover the entire diseased surface; I should interpose a screen of 2 mm. of lead, and I should leave it in place for six successive nights—that is, sixty hours. After six weeks of rest, I should begin again, and so on, consecutively. The radiation coming through the 2 mm. of lead, would be formed of "*rayonnements surpénétrants*" of about 5,000 activity.

The question of the treatment of vicious cicatrices is more complex.

Radium, in any case, can only be useful when the cicatrix is prominent, and even then there are two points to be considered. If, in the cicatricial prominence, there be joined keloid tissue, then the treatment will be efficacious. If there be only sclero-fibrous tissue, it will be necessary to destroy it, and this destruction always involves the eventual possibility of the production of telangiectasis, which is entirely opposed to the aesthetic point of view, and dominates the question of treatment of vicious cicatrices.

The rule is only to treat cicatrices with prominent bridles, if they are supposed to be keloid, and not to treat other kinds, except when they are particularly unsightly.

Several slides illustrate some of the results that I have obtained in cases of vicious cicatrices. When these cicatrices contain keloid tissue the technique is the same as for the keloids.

Here is a case of an upper lip which was retracted by a vicious cicatrix; the treatment has restored to the lip its lost flexibility, enabling it to descend and to meet the lower lip and to close the mouth, thereby most advantageously changing the child's physiognomy.

We have now come to the large groups of angiomata. Here the action of the radium is heroic, and we must again know how to discern the cases which are particularly favourable. It is the projecting forms—erectile and tuberous tumours—which benefit most by the treatment. I am going, first, to pass these cases in review.

Here is a case of a vascular tumour of the scalp projecting nearly 7 cm.

These forms of angioma are frequently met with in babies. The surface, as well as the deep-seated tissues, has to be treated. Then it is necessary to employ the rays of medium penetration, together with a sufficient number of "*rayonnements surpénétrants*," and yet carefully to avoid all irritation or ulceration of the skin which would risk causing a haemorrhage.

CROSS-FIRE.

This result is obtained by my method of "cross-fires," which I should like to explain.

An apparatus is placed on one side of the tumour, and another exactly opposite to it on the other side of the tumour. At each application these apparatus must be left in place sufficient time just to escape causing any inflammation of the surface. During that time the super-penetrative rays cross each other, and augment the intensity of their action in the deep-seated tissues. The whole application is repeated the following day. It is by that method that this baby was treated.

He received in the first series ten treatments, one each day, having two round varnish applicators 1 cm. in diameter, each containing 1 cg. of radium of activity 500,000. These applicators were covered with a screen of aluminium $\frac{3}{10}$ mm. in thickness, and the activity utilized was about 20,000, composed of all the beta and the gamma rays.

This first treatment was followed by four weeks' rest, at the end of which the tumour had diminished to such an extent that it was not possible to apply more than a single flat apparatus on the summit. A screen 1 mm. thick was interposed and left a whole night. This second method of treatment was repeated for two more nights, allowing a night's rest between each application. One month later the tumour had nearly disappeared.

This process of cross-fire, which augments the intensity of the very penetrative rays, and at the same time allows the less penetrative rays to act, constantly renders the greatest service. It reduces the length of the applications, and consequently the length of treatment. It can be employed with the apparatus either naked or covered with any of the series of screens. Every case and every region that lends itself ought to be treated by this process.

Some of the regions favourable to the action of cross-fire are the ear, above all the lobe; the nose; the cheek, one apparatus being placed in the mouth, and the other on the skin; the lip; the breast; cancer of the intestines, if it be possible to place on the tumour a tube in a catheter, introduced through an artificial anus, and at the same time place another on the abdominal part; hypertrophy of the prostate, treated by introducing at the same time one tube into the urethra and another into the rectum; and finally, all salient tumours such as I have shown you on the model, and all the vascular tumours. Here is a series of five cases which have all been treated by this method.

The angiomata of the mucous membrane, like those of the two latter cases, are sometimes cured with the greatest facility. Without forming actually salient tumours, the angiomata offer sometimes a raised surface, and are then also very favourable to the radium treatment.

A further four cases were treated by five hours' application of a round applicator, 6 cm. in diameter, containing 0.20 of radium, activity 500,000, and employed unscreened. This caused a fairly strong inflammation, resulting two months later in an absolutely level surface.

Angiomata will sometimes develop into veritable monstrosities, covering the whole of one side of the face. You will see on the five slides I will now present to you how the most favourable results have been obtained in these cases, abandoned until now by therapeutics. The last case shows an enormous angioma in course of treatment. The lower part alone has been treated and cured, and by comparison with the parts that have not yet undergone treatment you can estimate the extraordinary influence of radium on angioma.

We come now to the flat forms of angioma, with naevi-vascular tones; these are much more difficult of treatment. In the beginning we tried applications causing violent irritation; the results at first were exceedingly fine, but afterwards we found on one hand that the tissues became often too white, like scars, and, on the other hand, there sometimes unexpectedly occurred, after one or two years, some telangiectasis of new formation, which altered the aesthetic appearance of the first results. During the last

year and a half we have employed another method, that of radiferous linen, containing radium of weak radioactivity—50,000—and with interposition of a screen of aluminium from $\frac{3}{100}$ to $\frac{8}{100}$ mm. The linen is left in place for from twenty to thirty hours by applications of two hours each day. After one month's rest the treatment is recommenced.

This treatment is long, but it brings about the decoloration of the skin surely and by degrees, and without causing the slightest irritation, and is certain to produce neither too much decoloration nor any irregularities and inequalities of the decolorized surface.

Some results that deserve mention were obtained in cases of varieties of dermatic diseases. Chronic lichenous eczema yields admirably to radium treatment.

One such case had been treated for several years without the slightest result; it was cured in one month by the following method:

A large round apparatus, 6 cm. in diameter, containing 0.10 of radium of 500,000 activity, covered simply by a fine piece of indiarubber, was applied to each place for three minutes, for three successive days, which makes nine minutes in the three days. After one week's rest, the same treatment was recommenced, and again, after another week's rest. The superficial pruriginous inflammatory lesions were quickly healed, but there still remained a thickness of the tissues. I then covered the same apparatus with 1 mm. of lead and made twelve hours' application, two hours each day, and the complete cure was obtained.

Even on babies, where the skin is so delicate, it is possible in curing eczema to apply the most powerful apparatus unscreened, on condition that the apparatus is only left one or two minutes in place each time.

Here is a case of rebellious acne, which was most happily modified, but the result is not perfectly complete. Six months ago some elements reappeared, which we are now beginning to treat again.

In the following cases that I have now to show you the lesion needed to be destroyed in order to be ameliorated, for radium has no specific action. This case of ichthyosis hystrix required ten hours' application of a powerful and unscreened apparatus of 500,000 activity.

Here, again, are two cases of pigmentary tumours, which left after destruction a little trace of scars.

Gentlemen, I have now finished my demonstrations, which are the results of observations of 1,000 cases. In so short a time it has not been possible to do more than show the stepping-stones and point out the signposts of the methods I have employed.

Radium therapeutics has become a very extensive subject, and so, finally, I must ask you to grant me your indulgence for the insufficiency of many of my demonstrations, as well as for the very lengthy time I have retained your attention, and I thank you heartily for the patience you have shown me.

DISCUSSION.

Sir MALCOLM MORRIS, K.C.V.O. (London), in moving a formal vote of thanks, said that these new therapeutic agents were extraordinarily difficult to put upon a working basis, and it was a matter for congratulation when the scientific establishment of one of them fell into the hands of a man who was, and had been throughout his career, trained scientifically. Dr. Wickham had had the good fortune to have a large quantity of radium placed at his disposal, but would any one else have made so much of a like opportunity? It was not exaggeration to say that, just as in general surgery there were two great epochs, the one "before Lister" and the other "after Lister," so in the application of radium in medicine there were also two epochs, "before Wickham" and "after Wickham." Many of those present had been using radium before Wickham began. Some of them had been using it since 1901, but empirically, and without any assurance that they had not in a particular case done more harm than good. But through the principle of radium filtration the danger had been reduced to a minimum. If it were not for this principle, they would still have this active remedy in their hands, but be incapable of using it. All the speaker knew of the scientific application of radium he had learnt from Dr. Wickham in Paris. Nevertheless, although he thought they might follow as closely as possible in the lines of the master who had given them the idea, yet when they worked alone and used it by themselves day after day for months they were bound to come across some new points and find themselves groping in the dark with regard to many others. With respect to the question of filtration, the three rules to which Dr. Wickham had drawn attention were really the key to the position at the present moment. The cases in which he was particularly interested were those to which Dr. Wickham's third rule applied. Recently he had a case in which the tuberculous glands had been removed on three different occasions, and in order to avoid another surgical investigation, which seemed likely to be equally unavailing, he thought he would try the effect of radium. There were three tuberculous glands. There could be no question as to the accuracy of the diagnosis, for there were the previous operations to go upon and the microscopical proof. He used a filter of 2 mm. of lead and gave long exposures, two hours a day for six days on one gland. At the end of three weeks there was not a trace of the gland left; moreover, the skin was untouched, and there was no sign of a burn. The other glands were treated in the same way, with the same result. Again, rodent ulcer in its early stages was a formidable matter, not only to the dermatologist, but also to the surgeon, especially when situated in the region of the eye and the nose. But wherever such rodent ulcer existed it could be removed by radium after several hours' application with moderate screening. A crust formed, and this, at the end of six or seven weeks, fell away. That, again, was an enormous advance. But in the case of early epitheliomas of the mucous membrane, they were standing on rather different ground, and in such matters he always safeguarded himself with the report of a skilled surgeon. If the surgeon said the case was inoperable, then he felt that it was justifiable to try this or any other method, but not otherwise. Although in certain cases life had been prolonged, pain reduced, and the severity of the symptoms mitigated, they had been disappointed in absolutely favourable results. There were cases affecting the mucous membrane—the very early ones—which might, he thought, be cured, but in these early epitheliomas of the tongue or the mucous membrane of the inside of the cheek they were in a difficult position. The surgeon would say that these were perfectly operable, and without great deformity or damage to the patient's tissues. Nevertheless, it was advisable to safeguard oneself with the opinion of the general surgeon before undertaking any case of this sort, as results with cases affecting the mucous membrane were not so favourable as those of superficial cases of the skin.

Dr. ROBERT B. WILD (Manchester), in seconding the vote of thanks, said his own experience of radium had been small, and belonged chiefly to the pre-Wickham era. Work done in that era would rank as pioneer work, but, as compared with it, Dr. Wickham's results represented the difference between science and empiricism. He had had the great advantage of possessing sufficient of the remedy to cover an adequate portion of the skin at one time. Others had results which promised much, but the area over which they could apply the radium was so small, that in the class of cases the speaker saw at the Manchester Cancer Hospital, the chief benefit lay in the treatment of isolated nodules. With these they succeeded in spite of the crudity of their apparatus. Nodules the size of a sixpence or a shilling, and ¼ in. height, disappeared under the radium, and the fact that they could get rid of nodules of this size proved that the remedy had distinct possibilities. He had been much interested in the difference between skin lesions and mucous membrane lesions on which Sir Malcolm Morris laid stress. The speaker found no good results on the mucous membrane in the case of small epitheliomatous growths at the orifice of the salivary ducts just beneath the tongue. The impression previously formed in his mind was that the *x* rays would do practically all that radium would do, and that they were of greater therapeutic value because of the larger area that could be treated. But they must now conclude that there was a distinct difference between the *x* rays and radium. Dr. Wickham's slides had brought out that point in a most marked manner. The way in which some of the lesions involving cartilage healed up under radium was very wonderful. In several of the cases demonstrated by Dr. Wickham the cartilage was shown exposed in the one photograph, while in the other, after the radium treatment, the lesion had healed up in a manner that the speaker had never

seen equalled with the *x* rays in lesions of similar depth. That in itself was sufficient to demonstrate a difference between the action of the two agents. The deeply penetrative powers of the gamma rays, after being filtered as Dr. Wickham filtered them, were hopeful for secondary gland lesions of cancer hitherto inoperable and untreatable. The cross-fire method, offering as it did a favourable means of reaching the deep tissues, was likely frequently to be useful. When radio-activity came to be investigated some years ago, the speaker thought it would be interesting to test the influence of radio-active substances upon sensitive nerve-endings. The difficulty was the expense of testing radium by pharmacological means, but he carried out a series of experiments with salts of uranium and thorium, as well as solutions of thorium emanations, and watched their effect upon the heart of a frog; 16 mg. of pure radium bromide placed exactly opposite the vagus endings of a frog's heart and the intracardiac ganglia appeared to have a negligible influence. When it was remembered that the smallest quantities of atropine would depress the heart's action and that a minute electrical current would have an immediate influence, it was all the more remarkable that radium under these conditions, ¾ in. away from the vagus endings of the heart of a frog and with no screen, would not apparently alter it in the least. The same amount of radiation as was playing upon the frog's heart would, in a similar length of time, cause a severe burn upon the skin.

Dr. J. GOODWIN TOMKINSON (Glasgow) said that if he might find fault with Dr. Wickham it was because he did not sufficiently dilate upon the æsthetic quality of the cicatrices resulting from his method. From every point of view these were of striking cosmetic character. The speaker's attention had been particularly arrested by one of the first cases seen by him in Paris. This was a patient of Dr. Thibierge, treated by Dr. Dominici, suffering from very extensive malignant disease of the nose. After four applications, not only had the neoplastic tissue practically disappeared, but the original shape of the nose had been restored, while the cicatrix was smooth and flexible. The original conformation of the parts appeared to have been renewed, for the member, as it existed before treatment, bore little resemblance to the normal nose. This went to prove that they were dealing with a very different therapeutic agent from the *x* rays, for a lesion of that kind would defy *x*-ray therapy. He had become familiar with the therapeutic applications of the *x* rays, and, though excellent in ringworm and other conditions, they were not so satisfactory in the treatment of rodent ulcer. There might be an immediate improvement, but there was subsequent recrudescence. The discovery of a more potent therapeutic agent was therefore to be hailed with delight. There was one particular, however, in which these two physical agents approximated. When injudicious doses of either were given, telangiectatic scars developed. While on this subject he would point out that the disfiguring scars sometimes resulting from the *x*-ray treatment of lupus vulgaris might be obviated by giving several short series of small doses at long intervals, during which judicious cauterization was practised. The cicatrix then never showed telangiectasis to the degree of disfigurement.

Dr. J. H. SEQUEIRA (London Hospital) said he had found radium particularly valuable in dealing with small lesions, but it was only by the method of spreading the radium over a surface that they had been able to advance. He had treated some 170 cases, many of them in the pre-Wickham era, and had reached the conclusion that in radium they had rays which were of greater penetrative power than the *x* rays, or perhaps he had better say, manageable rays that could be used for greater penetration. He had been filtering the *x* rays for some time past. One of his assistants devised a filter consisting of lint soaked in sodium tungstate, and by this means it was possible materially to influence the course even of mammary cancer and cancer of the glands and tuberculous glands. He had also used a thin sheet of aluminium as the method of filtration in radium, and had followed up the infiltrated edges of rodent ulcer around the nose, where the involvement of cartilage was a very troublesome factor, and made it impossible to cope with it by means of *x* rays alone. In that type of case the *x* rays were markedly excelled by the radium. At one time he treated such cases by paring them down, curetting away the edges, and then using the *x* rays. When this method was followed, they would sometimes have an excellent superficial result but deep recurrences, some of them cystic in character and making big holes in the face. Those cases, he thought, were amenable to treatment by radium, and it was not necessary to put the patient through a disfiguring operation. He had very little radium, but he made it work day and night. And in the big infiltrated cases the results were very much superior to anything they had obtained by the *x* rays, which, however, were still available for superficial rodent ulcer. The good effects of radium were seen to the best advantage in those cases in which there were horrible caverns. He had treated a number of tuberculous glands by means of filtered *x* rays. With regard to epithelioma of the mouth, Dr. Wickham and he were interested in a case in which there had been great benefit under radium, but some recurrence in the palate. The speaker's radium was of small quantity, but it produced a distinct effect upon the patient, who had since been under Dr. Wickham's care, with most excellent results. He followed Sir Malcolm Morris, however, in believing it to be unjustifiable to interfere with the surgeon's decision in such cases. If the patient had a chance of having the growth nicely and swiftly removed by the knife, leaving a clean scar, it was not right to deprive him of it.

Dr. S. ERNEST DORE (London) endorsed the remarks of Sir Malcolm Morris as to the revolution which had taken place in radium treatment when it was placed on a scientific basis. He remembered a case of epithelioma in which he obtained most excellent results with a small quantity of radium. But in those days they used small quantities, short exposures, and no filters, and the results they obtained were not to be compared with the results obtained now. He had had the pleasure of seeing some of the results obtained by Dr. Wickham in Paris, and there was no doubt whatever as to the advance that had taken place in radium treatment. Dr. Sequeira had spoken of filtering the *x* rays. He (Dr. Dore) took it that the *x* rays were gamma rays, and these could not be filtered in the same way as radium. Radium could be split up into its component rays. Alpha and beta were probably material particles, but the gamma rays were quite different, and corresponded to the *x* rays; probably they were the same as the *x* rays, and were vibrations of ether. The thing that struck him particularly was the possible differences in effect upon the skin of the different rays. The alpha rays were easily cut off by various thin interposing substances, but there were bodies—he believed polonium was one—which only gave off alpha rays. By the use of screens the gamma rays could be used quite separately from the others, but the beta rays apparently could not be used without the gamma rays. He wished to know whether there had been any results as a consequence of using polonium for alpha rays, or whether alpha or beta rays could be deflected by means of a magnet for therapeutic purposes. Would any special therapeutic value attach to that course of action? Dr. Tomkinson had spoken of telangiectasis, and he (Dr. Dore) wished to ask whether it was the more superficial rays or the deeply penetrating rays, or both, which had this effect. He was by no means an alarmist, but if Dr. Wickham had any cases of chronic radium dermatitis or permanent alopecia occurring as a late result of radium treatment it would be very important to know of them. Finally, could radium rays be used for tinea and hypertrichosis?

Dr. TREASURE wished to know what was the present position of radium in the treatment of lupus. They had not heard anything about lupus that day.

Dr. J. METCALFE (Bradford) said that the point which had particularly impressed him was that referred to by Dr. Dore. They heard a great deal about the penetrative power of the alpha, beta, and gamma rays, and that the last-named had an effect upon the deep tissues, but was there any intrinsic difference in the actual results obtained? Was it simply a matter of filtration pure and simple, or a matter of the ray acting on the different tissues in a different way? In other words, if Dr. Wickham could get the gamma rays to act upon the skin, would there be any difference in the reaction from that produced by the alpha rays acting in the same way? The last speaker referred to radium in the treatment of lupus. He (Dr. Metcalfe) had used *x* rays and the Finsen-Reyn lamp in the treatment of a case of lupus of the septum cartilage

of the nose, and although the malady had not healed it had not increased with any rapidity. Some months ago he used some radium on six or seven occasions, and the hole, which had always shown an advancing ulcerated surface, had healed up. Dr. Sequeira had referred to his filters of lint soaked in sodium tungstate. Dr. Morton had told him about that method of filtration, and he had used it in a number of cases, with effects absolutely reliable and excellent. He had been wondering whether some similar method of filtration would be applicable to radium. It might be better even than lead or aluminium.

Dr. J. A. CODD (Wolverhampton) said that radium appeared to be more amenable to accurate measurement and adequate handling than the *x* rays. Was it possible in some way to co-ordinate the two sources so that results in radium might be expressed in terms of *x* rays, those who worked only in the latter being thus able to take advantage of the results obtained by the radium workers? If units of radium could be expressed in terms of *x*-ray units, it would be of very great assistance, and Dr. Wickham's filters could be used with equal accuracy and effect in *x*-ray work. He had been in the habit of using filters with *x* rays for some time past, and they had proved very successful, but with a more excellent system of filters, such as Dr. Wickham had at his disposal, the results, of course, would be much more satisfactory.

REPLY.

Dr. WICKHAM said that it would be very difficult for him to answer all the questions which had been raised. It must be understood that radium science was only at its beginning; when they spoke about mensuration they were only taking the first steps, and might be very far from being finally right. He was not prepared to say what was the precise part played respectively by the beta rays or the gamma rays. It would be very interesting to know. They only knew that, using filters of a certain thickness —say 4 mm.—of lead, nothing but gamma rays could act, and those only after a long application. He had tried polonium, as one speaker had suggested, but the activity coming from polonium was very weak indeed. They were trying at present to concentrate the activity of polonium, and perhaps later on they would have something to say about it. Telangiectasis following upon radium treatment seemed to depend upon the tissues themselves. If rodent ulcer or pigmentary naevi or flat vascular naevi were treated by producing inflammatory conditions, they might see, after the inflammation had healed, telangiectasis appear, and after an apparently good result a new reddish scar would form and another naevus return. It was necessary to know what were the conditions of the tissues likely to give rise readily to telangiectatic scars. They had had a very instructive case of chronic radium dermatitis. It was that of a nurse who had had two of her fingers affected in exactly the same way as in the dermatitis following the *x* rays. She was now compelled to refrain from touching the apparatus, although she was allowed to give instructions to others. He had not tried radium upon tinea, the method of Sabouraud being so splendidly satisfactory. Of course, from the scientific point of view an experiment upon tinea would have an interest. In treating hypertrichosis it was necessary to have thick screens and rays with a deep power of penetration. This procedure never produced the least inflammation. In the case of lupus the Finsen treatment did so well that they naturally sent a patient first to that department. In lupus of the conjunctiva, radium apparently did well. In lupus erythematosus it did just as well as other treatments, but he could not say that it did better. In conclusion, Dr. Wickham expressed his thanks for the reception which he had been accorded, and mentioned the fact that, although a Frenchman, he had an English ancestry.

ON THE TREATMENT OF NAEVUS BY RADIUM.

(FROM NOTES OF TWENTY-FOUR CASES.)

By HENRY LEWIS JONES, M.D., F.R.C.P., M.A.,
Medical Officer in Charge of Electrical Department, St. Bartholomew's Hospital.

THE fact that vascular naevi are favourably influenced by the radiations of radium is now well known, and cases of the successful use of radium in this condition have been recorded by numerous writers. Something still remains to be learnt of the details of the procedure to be adopted in the employment of radium in these cases, and the following observations are based upon the treatment of 24 cases in the electrical department of St. Bartholomew's Hospital.

The specimen of radium at my command consists of 15 mg. of radium bromide, with a radio-activity of about 500,000—that is to say, of about one-quarter of the strength of the pure salt. It is enclosed in an aluminium capsule or button 1 cm. in diameter, and is so fixed in the capsule as to form an even layer, giving off a uniform radiation from the whole front surface of the button in any position. The application to a naevus is made by fixing the button on the part with a piece of adhesive plaster, and a layer of thin gutta-percha tissue is generally placed between the button and the skin. The time of the application has generally been for one hour, but I now think that a somewhat longer time—say an hour and a quarter—would be better.

In order to simplify matters the naevi selected for treatment have been small ones of about the same size as the radium button, so that the whole area of the naevus might receive identical treatment. All have been actively-growing, florid naevi in young babies, and all have undergone retrogressive changes after the first application of the radium.

The general behaviour of a naevus after an application is that a reaction begins in the course of about five days. This reaction shows itself first by an increased redness of the surface, followed very soon by a gradual flattening of the naevus if it has previously been raised; then the surface becomes less florid, a little desquamation or the formation of a thin dry scab takes place, and this falls off and reforms several times, while the naevus continues to become paler and of more indefinite outline. At last it fades away and the skin assumes a natural appearance, retaining for some time a faint pink image of the original naevus.

No formation of a sore or moist oozing surface has been observed, and the part seems to need no after-dressing. The whole process of evolution takes a month or six weeks, the latter stages being somewhat slow. No pigmentation of the surface has been observed.

The action of the radium is very strictly localized to the surface in contact with the button, and probably this may be explained in part by the fact that the aluminium capsule containing the radium is fixed in a brass holder, which has the effect of encircling it with a ring of brass, which would certainly obstruct the passage of the rays through the rim thus formed. In several of the cases treated a portion of the edge of the naevus or a small satellite naevus has been outside the edge of the button, and has persisted or has even continued to grow, while the treated central part of the naevus has been retrogressing favourably.

When the naevus has been smaller than the button the healthy skin surrounding the naevus is acted upon, and an inflammatory reaction is produced, so that the mark of the button is made visible, and has usually remained as a red patch for about three weeks before clearing up.

An interesting point in support of the theory that radium acts more particularly upon young and actively growing tissues is to be found in comparing the effect of radium upon naevi with its effect upon the port wine mark of adults. Although radium is useful in the latter, I have found that longer exposures are required to obtain the desired result, and that the amount of reaction in the skin over a port wine mark is less than is seen in the skin of a baby.

In a case of stellate naevus in a girl of 11 years an application of the radium button for an hour produced a lively reaction in the skin, but when this had cleared up the stellate naevus was seen to be unchanged, and its little central vessel could be seen to pulsate as before, when the surface was viewed through a glass compressor.

Of the total number of cases under review, 12, or one-half, have been completed with a single application. Six have required a second application, 4 are not yet completed, but are markedly altered for the better, and 2 have been treated with a very low grade sample of radium for periods of two and four hours without any marked result as yet.

Two of the cases had a pair of naevi close together. Case 10 had two naevi of the shoulder, each about a centimetre in diameter, florid and raised. One was treated on May 4th, and on May 20th this was faded and flattened while its neighbour was still active. The second one, treated on May 20th, was also in a state of marked retrogression on June 4th. Case 21 was similar, except that the naevi were near the edge of the anterior fontanelle. One was treated on June 22nd and the other on July 6th. Both are now almost obliterated.

It is unnecessary to say much about the advantages of radium for the treatment of naevus. A method which is painless, needs no subsequent dressings, and leaves no scar, is of supreme importance, and I consider radium to be most valuable in naevus cases.

THE ETIOLOGY AND TREATMENT OF PRURITUS ANI.

By J. GOODWIN TOMKINSON, M.D.,

Medical Electrician, Glasgow Western Infirmary; Dermatologist, Glasgow Hospital for Diseases of Ear, Nose, and Throat.

WHILE the etiological factor in pruritus ani is often a local one, its causation is not infrequently to be found in some functional or organic defect in the complex processes of general metabolism. Its cause, however, is not always discoverable, even after the most careful and thorough examination. The affection is common to both sexes and at all periods of life. In children a frequent cause is the presence of intestinal worms. In women pregnancy or some morbid state of the reproductive system may be the causative factor, while in the aged it may be due to the degenerative cutaneous changes peculiar to that period of life.

Having excluded such conditions as haemorrhoids, vascular congestion from pelvic tumours, hyperidrosis, fissures, pediculi, intestinal worms, etc., and the indiscriminate use of unsuitable material for toilet purposes, the causes of pruritus ani and the other forms of localized pruritus are identically those of generalized pruritus, and are, as expressed by Professor Gaucher, diathetic and autotoxic. Diseases of the liver (often associated with haemorrhoids), diseases of the kidneys (albuminuria, diabetes, etc.), gastric and intestinal disorders, and the gouty and rheumatic diatheses may be cited. Indeed any morbid condition capable of disturbing directly or reflexly peripheral innervation may be regarded as a possible etiological factor.

Men are more frequently the subjects of pruritus ani than are women, and are perhaps more often attacked in the active period of life when occupational demands are greatest. These in themselves are doubtless an aggravating factor; but irregular and hurried meals and indiscriminate and excessive indulgence at table, especially in subjects of the gouty diathesis, are probably more directly concerned in its manifestation. In such cases spa treatment is often of distinct benefit, due not only to the increased elimination of effete matters through renal and intestinal stimulation, but to the adoption of a more restful and rational daily régime.

The dermatologist is confronted with few affections, if any, more distressing to the patient than pruritus ani. Whatever the daily condition, nocturnal exacerbations occur in all cases, and the consequent and continued interference with sleep leads, in some instances, to very grave disturbance of mental health.

The recognition of the actual causative factor is all-important in determining a rational course of treatment, but as previously indicated it is not always so obvious "that he may run that readeth it."

A strict inquiry into the occupation, habits and diet should be made, and in no instance should urinary examination be omitted. In the presence of haemorrhoids, anal fissure, pediculi and other local causes, appropriate treatment should of course be adopted. Max Joseph lays special stress upon the regulation of the bowels in all cases and recommends the application of a lotion of perchloride of mercury (1 in 1,000) after each defaecation. Of aperients a daily saline taken fasting is undoubtedly the best.

The diet should be regulated to suit the individual case, but alcohol and coffee should be generally proscribed. Game, pork, duck and other easy fermentescible foods should be forbidden, and highly-seasoned dishes and soups rich in extractive matters should be similarly proscribed. A milk diet for the first days of treatment is distinctly beneficial.

Gouty and rheumatic patients will require appropriate medication.

The careful administration of the tincture of cannabis indica is of value in all obscure forms of pruritus, it should be suspended in mucilage, freely diluted, and given after meals. Other sedatives, such as the bromides and phenacetin, may be employed.

Spa treatment—previously alluded to—is often of benefit. I have observed marked amelioration follow a course of Harrogate strong sulphur water. Other suitable spas are Strathpeffer, Vichy and Contrexéville.

While pruritus ani is described as a defect of innervation with no symptom other than itching, or similar sensation, and exhibiting no apparent structural change, yet, although the parts often show little evidence of scratching, excoriated and eczematous modifications of the parts do not infrequently occur as the result of frenzied digital attacks occasioned by the intensity of the exacerbations. The strength of local applications should therefore be regulated by the condition of the parts. To cite all the medicaments recommended for local treatment would be to give a list of every known drug claiming local antipruritic properties. Perhaps, however, the carbolic acid and the tar series are the most frequently employed. In cases of obscure causation Sabouraud advocates strong tar preparations. These often cause considerable smarting, which, however, is followed by almost immediate relief and in some cases a cure is claimed after a few weeks' treatment. In all cases the parts should be kept scrupulously clean. The application of water as hot as can be borne often affords temporary relief. This should be followed by the application of a lotion of tar and lead, carbolic acid or corrosive sublimate of suitable strength, and the subsequent smearing of the parts, after careful drying, with a cocaine ointment, or still better, in those cases where the itching extends into the rectum, with the introduction of a cocaine suppository.

Mercurial ointments when rubbed in, and in less degree when simply applied to the parts, are certainly absorbed, and marked relief often follows their exhibition.

Unfortunately there are many rebellious cases where the preceding remedies are but of the most temporary benefit. In these intractable cases the actual cautery or linear scarification has been employed. Such drastic measures, however, are much less frequently indicated since the introduction of radiotherapy and treatment by the high frequency current. Static electricity also has its advocates, and the continuous current—the + pole applied to the affected area—is also recommended. I have been particularly pleased with the result of high frequency treatment in a rebellious case of two years' duration which is now virtually cured. There are, however, occasional relapses, but these are becoming progressively less in intensity and quickly disappear after a short course with the vacuum electrode.

Judging from the good results recorded by MM. Wickham and Degrais in rebellious pruriginous conditions, radium therapy may prove to be of similar service in pruritus ani.

To sum up: the local drug applications which in my hands appear to have been the most useful are tar and lead lotion and the mercurial ointments, while of physical agents the high frequency current has certainly proved of conspicuous benefit. No one, however, with the smallest experience of this affection would depend solely upon external treatment.

DISCUSSION.

Dr. HOWARD HUMPHRIS (London) said that the benefits of static electricity in this complaint, although mentioned by Dr. Tomkinson, had not received the attention in this country that they deserved. He could recall some dozen cases of pruritus of the anus or vulva which had been referred to him, and in none of them did static electricity fail to effect relief. In some cases the vacuum electrode, in others the breeze or spray, relieved the itching, and in one case, he remembered, the indirect spark had to be applied before relief was obtained. As a rule, the second or third day would show the desired result, and the longest duration of an unrelieved condition after this electrical

treatment that he remembered was one of ten or eleven days. In all cases, however, he had seen static electricity give marked relief and apparently permanent cure.

Dr. J. METCALFE (Bradford) stated that his reason for joining in the discussion was to draw attention to the almost constant association of constitutional conditions with pruritus ani. But the specific constitutional irritant which he wished to show as a frequent source of pruritus ani was the small intestinal parasite, the *Oxyuris vermicularis*. The point was that many persons suffered from the irritation of this parasite during the whole of their lives. They were treated periodically by every possible and impossible means, but it seemed as if the parasite could not be permanently eradicated. For a time the patient might imagine that he was free from his trouble, but it would return and he would suffer for hours from intolerable pruritus ani until the *oxyuris* was removed. The parasite probably did not actually breed in the intestine, but reinfection took place by the ova being carried to the mouth by the patient himself, possibly after scratching the anus and then rubbing the nose. What could be done for this condition? The most useful method of treatment appeared to be the washing of the anus after defaecation, followed by the application of a germicidal lotion or ointment to destroy the ova. The intestinal antiseptics, such as petroleum emulsion, salol, or creosote, were the most generally useful internal agents.

Dr. W. A. LOXTON (Birmingham) said that pruritus ani had been one of the most troublesome varieties of disease he had ever been called upon to deal with. It seemed to him that very frequently they were unable to detect a local lesion giving rise to the irritation. In many cases there had probably been a general constitutional condition which had interfered with the nutrition—perhaps of the sensory nerve endings—and thus some local irritation had been enabled to come into much greater activity. All the varieties of treatment which were recommended had been tried, but he had not met with anything having the action upon these cases which was possessed by the high frequency currents. Recently some cases had been under his care in which the treatment of this condition by high frequency had been of the greatest benefit. One patient had suffered from the malady for two or three years. He came to the hospital, but no line of treatment touched him at all. He was sent to the *x* ray room, but the vacuum tube was equally without any effect. He then had a very slight amount of sparking, and within a week was perfectly free from his trouble.

Dr. TOMKINSON, in reply, said that he was pleased to hear that Dr. Humphris had had such good results from static electricity. Brocq also strongly recommended it in pruritic conditions. As Dr. Metcalfe remarked, doubtless the physical agents, or some of them at least, acted constitutionally, and this would account in some degree for the good results that the last speaker was able to record.

A CASE OF CUTANEOUS ACTINOMYCOSIS.

By S. W. ALLWORTHY, M.D., M.A.,
Physician, Belfast Hospital for Diseases of the Skin.

[ABSTRACT.]

I AM well aware that similar cases of actinomycosis to the one I am about to describe have been recorded, and that the etiology and pathology of the disease are now well known. Nevertheless, I feel that complete histories of this comparatively rare affection may suggest new ideas and stimulate interest. In Ireland very few cases have been recorded, and until 1900 no case had been communicated to the Royal Academy of Medicine in Dublin.

Before treatment.

After treatment.

I have been unable to obtain statistics as regards the frequency of the disease in animals in this country, owing to the fact that it is not scheduled under the Diseases of Animals Act. During the past seven years only 2 cases have been detected in the Belfast abattoir. No authentic case is on record, I believe, of transmission of the disease from one animal to another, or from the lower animals to man, and consequently, after the removal of the affected parts, the flesh of actinomycotic cattle is, as a rule, admitted for sale.

CASE.—In July, 1908, a lady aged 25 years came to me and stated that in the first week of May, 1908, a small swelling began in the neighbourhood of some decayed teeth on the left side. It appeared to be an ordinary dental abscess. After a time it grew larger, and was lanced inside the mouth without any good result, and in a day or two the tumour was cut into from the outside, the only effect being the extraction of a small quantity of blood. Various lotions were applied, and some seven teeth extracted, but by this time several other small tumours could be felt. The nodules evidently continued to multiply in the subcutaneous tissue of the cheek, and after infiltration and softening of the cutis coalesced to form a mass of actinomycomata, as shown in the photograph taken on July 25th, 1908, which represents about two and a half months' growth. The lesion had a sharp, circumscribed margin, extending from immediately under the lower lobe of the left ear downwards along the course of the inferior maxillary bone to the chin, and in width from the sterno-mastoid in the neck to the middle of the cheek. The majority of the cutaneous and subcutaneous tumours were hard, firm, and elastic to the touch, and the whole surface was uneven and excruciatingly tender. The discharge contained minute grey granules and greenish-yellow particles which were easily detected by the eye when spread on a glass slide. Microscopic examination proved these to consist of colonies of the actinomyces or ray fungus. The characteristic long branching and finely interwoven mycelial threads of the streptothrix formation, with some radiating club or wedge shaped projections, were apparent in glycerine and stained preparations.

There can be little doubt as to how the disease originated, as my patient stated that she was in the habit of chewing and eating uncooked oaten meal in the form known as "flake-meal." The view generally held in such cases is that the awns of grain, covered with the fungus, penetrate between the teeth and into the gums and tongue. There was no derangement of the general health, but the case was complicated by the fact that she was a married woman six months pregnant, and consequently it was more difficult to decide upon the treatment to adopt. From the beginning of August until the middle of October I gave her about thirty exposures to the *x* rays. Each exposure was of about ten minutes' duration, and there was an interval of three weeks in the middle of September owing to a slight reaction. The treatment, while not sufficing to alter appreciably the size of the tumours, gave relief by making the part less painful and sensitive.

Treatment was suspended until the end of November, owing to the birth of a daughter, and then, having arranged that the baby should be artificially fed, Thomassen's treatment by iodide of potash was begun. A 10-grain dose was administered three times a day for the first week, one of 15 grains the second week, and 20 grains the third week. The mass of granulation tissue immediately commenced to contract, and the granules in the discharge from the sinuses were not so easily detected. By the end of January no trace of the fungus could be discovered. The dose was subsequently increased to 30 and 35 grains three times in the day, given intermittently after the third week in January, with cessation intervals of about a week at a time. At the beginning of March only two small tumours remained over the parotid region. By April she was able to do without any covering, and a photograph taken on June 14th shows the complete disappearance of the malady with the puckering of the resultant cicatrix. The large scar on the lower side is probably due in part to the former use of the lancet.

The case emphasizes the necessity for differentiating from actinomycosis any tumour of subcutaneous origin simulating new growth, and reddish or purplish-red in colour. It is also a further illustration of the negative effect of the *x* rays in promoting the absorption of the swellings and the destruction of the fungus.

DISCUSSION.

DR. R. B. WILD (Manchester) mentioned three cases of actinomycosis which he had seen during the past three years. In all these cases the fungus was demonstrated microscopically. One of the patients died from ulceration extending into the blood vessels of the neck, another was still under treatment and improving, and the third was cured, and remained well when last seen, twelve months after treatment had ceased. He could not say that

exposures to the *x* rays produced much benefit, and the good results were obtained by iodide of potassium, large doses of which were given for twelve months. For some weeks in succession, indeed, as much as 320 grains daily was employed in the treatment.

The PRESIDENT, referring to the comparative infrequency of cases of actinomycosis, said that sometimes a number of cases would be found together in the same district. A few years ago the surgeon to the Poor Law infirmary in the town of Lurgan discovered a regular mine of actinomycosis, and showed three or four cases in the course of the year.

THE SUPPOSED RISKS ATTENDING *X*-RAY TREATMENT OF RINGWORM.

By R. HIGHAM COOPER, L.S.A.,
Radiographer to University College and Evelina Hospitals, London.

[ABSTRACT.]

THE subject may be divided intc two parts: (1) Injury to the scalp; (2) injury to the brain. Dermatitis and permanent alopecia cannot be called "supposed risks," since most of us have unfortunately seen cases having one or both results. One or two points with regard to these conditions may, however, be mentioned.

Scalp Injuries.

In my experience injuries to the scalp occur in four varieties:

1. Visible dermatitis without any epilatory effect.
2. Visible dermatitis with temporary alopecia.
3. Visible dermatitis with permanent alopecia.
4. Permanent alopecia unattended by visible dermatitis.

The second and third of these are the varieties commonly described, but I have certainly seen instances of the first and fourth. All of them are avoidable if due precautions are taken, unless they result from idiosyncrasy.

The cause of an erythema which is not followed by depilation I believe to be the use of too soft a tube. Over-exposure is admittedly the cause of the second and third varieties, and I am inclined to think that this is frequently due to examining the pastille too often, thus exposing it to light and slightly bleaching it. The determination of the exact moment when the pastille matches the control is difficult, especially when working by artificial light, and I have tried to overcome the difficulty by taking a pastille which has been turned to tint B the same day, covering it from all light in a cryptoscope, and afterwards comparing it in the dark in front of an *x* ray tube with another pastille which I am using by artificial light. If the fluorescence of the two is equal I consider the dose correct. This experiment depends upon the fact that the fluorescence of a pastille diminishes in proportion to its change in colour. The period of examination must only be for a few seconds, as the exposure to *x* rays further turns the pastille.

Brain Injuries.

At the Berlin Roentgen Congress last April, papers were read by Professor Krause and Drs. Farsterling, Gocht, and Krukenberg on various injuries caused by the *x* rays, and, amongst other things, they noted perverted and arrested development in animals after prolonged exposure. Such experiments, however, cannot be compared fairly with the *x*-ray treatment of children suffering from ringworm. The skulls of the animals were smaller, the bones less thick, the exposures far more prolonged, and, I believe, repeated; moreover, the normal development of the animals upon which the experiments were made was infinitely more rapid than that of human beings, a fact which may be of considerable importance.

My own experiments confirm those of Dr. Macleod[1] in every particular. I placed a pastille, wrapped in a piece of black paper, and backed with lead foil, against the scalp of a child of 7, on the opposite side of the head to the patch under treatment. The same pastille, always placed in the direct path of the rays, was used for every exposure on that child and many others, until seventy-five exposures, each comprising the normal pastille dose, had been given. A pastille placed at a similar distance without the resistance of the head turns to tint B in sixteen normal pastille doses, but the pastille in question showed no appreciable change from tint A.

[The author here described some other experiments pointing to the same conclusion.]

Precautions Used.

In treating the scalp I am anxious not to have too soft a tube, and I make a rule that the person who is conducting the treatment shall turn off the current, not when the tube becomes blue, but when it shows signs of reversals. A more certain method which I have devised is this: A piece of metal is attached to the dial of an ampèremeter in the primary circuit in such a way that when a certain number of ampères are registered the circuit is completed and an electric bell is rung. (It may be used to cut off the primary current if a relay is introduced.) It is obvious that a hot-wire ampèremeter must be used, as the oscillation of the needle in other types would spoil the experiment. The *rationale* of this depends upon the fact that a greater ampèrage is registered as the tube softens. The converse being true, the same apparatus may be used to indicate excessive hardness, if one is employing tubes not fitted with mica regulators.

In conclusion, we are faced with these questions:

1. Have we any record of injury to the brain?
2. Is such injury possible?
3. If it is possible, how can we avoid it?

To the first question the answer is emphatically, No. Half a dozen workers between them have reported 12,000 cases, and not one instance suggestive of interference with development or other brain injury has been noted. For my own part, I have treated over 180 cases by the fractional method, and given 2,000 doses with Sabouraud's pastilles, and know of no injurious result to the brain.

With regard to the second question, we must first consider what is the smallest dose that could cause injury. My own experience has been that a smaller dose than one pastille has a temporary stimulating effect, while any dose over one pastille tends towards inhibition and destruction of function. Whether my figures are right or wrong, it is scarcely conceivable that any part of the brain could receive a full pastille dose, while if the figures are correct the dose is infinitesimal.

Granting, however, the possibility of such injury, I would limit such possibility to cases in which a hard tube is used. All possible risk is eliminated when the patient is treated with a moderately soft tube, especially if Adamson's five-exposure method is employed.

Lastly, what of idiosyncrasy? The only example I have encountered was a case in which the patient was first treated by the fractional method without result; then a pastille dose was given ineffectually, and after three months' interval a dose was given slightly exceeding tint B, and still neither epilation nor dermatitis occurred.

[1] *Lancet*, May 15th, 1909.

DISCUSSION.

Miss MARGARET DOBSON, M.D. (Bradford) said: My experience has been very limited; but I should like to suggest a cause for a danger attending the treatment of ringworm by means of *x* rays which I have not seen mentioned in the literature of the subject. The education authorities in Bradford have lately had installed an *x*-ray apparatus for the treatment of ringworm occurring among school children, and during the past four or five months I have treated 270 ringworm patches by means of the *x* rays. In all these cases a microscopical examination was made, and with the exception of 5 cases the ringworm was found to be due to the *Microsporon audouini*. In 3 of the remaining 5 cases the disease was due to the *Megalosporon endothrix*, and in the remaining 2 apparently due to the *Trichophyton ectothrix*. In all these cases practically the same *x*-ray dose was given, and those cases due to the *Microsporon* followed the usual course, epilation being successful in some cases; *not* in others. In the 3 cases due to *Megalosporon endothrix* the patches, in one case after twenty-four hours, and in a second after ten days, swelled up, the skin becoming raised, oedematous, and glossy. The hair follicles suppurated, the hairs becoming loose and falling out. (The hairs surrounding the patch were unaffected.) The glands of the neck became enlarged and painful. Apparently a bad condition of kerion was

produced. I should like to suggest that in those cases of ringworm in which the disease is due to the *Megalosporon endothrix* there is a greater risk of burning the scalp and producing permanent baldness, and I should like to know the experience of others in this matter. In the 2 cases in which the disease was due to the *Trichophyton ectothrix*, the disease at the end of four or five weeks cleared up without any epilation at all.

Dr. F. HOWARD HUMPHRIS (London) said: As to the infallibility of the *x*-ray treatment in ringworm, I may cite two cases at the West London Hospital—sisters—the one aged 5 and the other 6. Each case was given a full pastille dose; in one Dr. Arthur superintended the administration, and in the other the dose was given by myself. Total epilation followed in each case, and the children were allowed by Dr. Arthur to return to school. Some weeks later, however, they were brought back to the hospital, the mother stating that they had infected a neighbour's child. The child in question showed a distinct patch of tinea tonsurans. The two little girls had a new growth of hair of a most suspicious appearance. I sent them up to Dr. Abrahams of the Skin Department, who pronounced the patches to be infected. It may be urged that the fallacy consisted in an error of treatment, and though this is at all times possible, I would point out that the treatments were not given by the same man, and that they are the only two cases, in the course of the four or five months during which I have been working with Dr. Arthur, where this occurred. It will be asked whether any germicidal drug was used. A 10 per cent. iodine solution was prescribed, but I cannot guarantee that it was used, although the mother appeared to be careful and conscientious. But I would point out that if we are to rely upon drugs—or even use them—we must logically abandon our position of claiming a cure for ringworm by means of *x* rays, and simply say that the rays are a useful adjunct to the other methods of ringworm therapy.

Dr. JAMES METCALFE (Bradford) said: The preceding speaker has drawn attention to two cases of recurrence, but I should like to state that it is out of the question to obtain destruction of the spores in ringworm and freedom from the possibility of recurrence without energetic after-treatment. Solutions either of tincture of iodine or mercuric preparations should be applied daily for some time after the application. If epilation has been properly produced and the after-treatment is carried on continuously for some weeks no recurrence should take place.

Professor ROBERT B. WILD (Manchester University) said: I should like to call attention to Dr. Aldersmith's observations, made many years ago, that if we can produce in ringworm a condition resembling alopecia areata the ringworm is readily cured. By the use of the *x* rays such a condition of complete epilation is most readily produced and found to be a valuable addition to our means of treating the disease. It must, however, be remembered that it is easy to exaggerate the importance of scalp ringworm. Apart from the delay to the child's education, it is rarely serious, compared with some affections the *x* rays have to treat, and causes no great suffering or constitutional trouble. The proposed compulsory treatment by *x* rays is, in my judgement, a thing to be strongly resisted. The danger from the use of *x* rays in ringworm is occasional permanent alopecia, and in many cases a loss of brightness and a coarseness of the texture of the hair, which renders the radiated patches quite distinctive for some time after the hair has grown again. There is no evidence of injury to the brain, but probably it is unwise to give many exposures and epilate the whole head at the same time. The experience of *x* rays in treating lupus cases in children on parts where the brain is necessarily in the track of the rays—an experience which covers many years—shows that there is no danger of brain injury from the dose necessary to treat ringworm. I do not believe that the ordinary exposure for ringworm will do harm to the ordinary child. I remember a case of an anaemic boy who always fainted during a sitting, but this, I think, was to be attributed to the nervousness and excitement of a particularly nervous child.

Dr. J. H. SEQUEIRA (London) said: I have had experience of nearly 1,400 cases of ringworm and favus treated by the single-dosage method at the London Hospital and privately. This means about 7,000 exposures (for only a part can be done at once), and I do not hesitate to say that the risk of injury to the brain is imaginary. I agree that it is unwise to expose a child's scalp to the rays if the fontanelle is not closed, and, indeed, until after the third year. But it is unnecessary to contemplate *x*-ray treatment in such young subjects. It may, of course, be urged that in a large out-patient clinic it is impossible to follow up the cases and to find out whether there is any brain trouble or not. I agree with this criticism, but no fewer than 267 of my patients have been inmates of orphan asylums, children's homes and schools, where the condition after treatment has been under the expert observation of the medical officers and teachers. In view of this discussion I have communicated with the authorities of these institutions, and their reports are perfectly unanimous. They have not observed a single case of abnormality in the mental condition following the *x*-ray treatment. In a considerable number of these cases the observation has extended over two years. This evidence so kindly given me by the officers in charge of the children is, I think, conclusive. Sabouraud and others confirm this. I have also made some experiments which confirm the experience of Macleod,[1] that the scalp and skull prevent the passage of all but a small fraction of the rays given off by the *x*-ray tube. Dermatitis does not occur if the Sabouraud pastille is used, but I have seen permanent alopecia in five instances. In two of this number it was due to an accidental overlapping of the areas treated, so that a small part of the scalp received a double irradiation. In a third instance the central part of the area treated, owing to excessive curvature of the skull, was too near the anode. In the fourth and fifth cases rather large areas have been permanently affected. They were both early cases, but both occurred in groups treated at the same time and under identical conditions without any similar results. In one of them there had been some rather severe treatment by irritants before the *x* rays were applied. It is, of course, possible that idiosyncrasy plays some part. Children with soft, fine hair require a less prolonged application than those with strong, wiry hair. There are two points upon which I desire to lay emphasis. One is that we are dependent upon the careful manufacture and testing of the pastilles. Pastilles have been put on the market with which it required 30 per cent. too much of the rays to produce the prescribed tint. The danger of this is obvious. The discs supplied by Drault have always proved satisfactory. Secondly, it is useless to rely upon time measurement and on the tachimeter. This instrument is useful as a guide when the condition of the tube is known and is steady, but it cannot replace the pastille as a measure of the dose of the rays. With a steady current and with the interrupter making 800 dips per minute, in successive experiments with the same tube we have obtained the Sabouraud B tint respectively in six minutes, five minutes, three and a half minutes, and two and a half minutes. Recently in experimenting with a new pattern tube we obtained the pastille change in two minutes. These conditions are, of course, dangerous for ordinary working, as an extra half-minute's exposure would mean an overdose of more than 30 per cent.—enough to cause permanent epilation, if not dermatitis. I advise working with a tube which will give the requisite tint in ten to twelve minutes or more. When the operator is expert he may possibly reduce the time by altering the condition of the tube, but it is not necessary or advisable. Under-exposure, though troublesome, is much better than running the risk of alopecia. Should an area be under-exposed and the defluvium be partial, I always wait for a month or six weeks before submitting the area to the rays. In conclusion, I venture to express the opinion that with proper apparatus, used with sufficient care and according to Sabouraud's instructions, the *x*-ray treatment is efficient, rapid, and safe. To cover the small risk of idiosyncrasy and to guard myself and my staff I insist on the parent or guardian of the patient familiarizing himself with the nature of the treatment, and giving a written undertaking that no liability is incurred.

Dr. ROBERT W. MACKENNA (Liverpool) said: After the valuable experimental evidence which has been brought forward by Dr. Higham Cooper and others, I think that the possibility of permanent damage to the brain following on the *x*-ray treatment of ringworm may be definitely

[1] *Lancet*, May 15th, 1909, p. 1373

excluded. Still, it would be advisable never to irradiate the scalp of very young children whose fontanelles are not closed, and I would suggest as an age limit five instead of three years as suggested by Dr. Sequeira. It is well known that *x* rays exert their detrimental effect chiefly on cells in active metabolism and growth, and in a child the metabolic activity of the brain cells is not so great as that of some other cells of the body. I may point out that alopecia of long duration may follow ringworm which has not been treated with the *x* rays, and I believe that some of the cases of partial but not permanent alopecia following *x*-ray therapy without dermatitis may be independent of the treatment. In cases where an overdose has been administered with prolonged alopecia following, I would suggest that at puberty, when the hair follicles in other parts of the body awaken into activity, there might be a return of hair to the denuded scalp. I endorse Dr. Sequeira's suggestion that the risks of the treatment should be explained to the parents, and that before treatment the parents should be required to sign a paper exonerating the therapeutist from liability. I think that in the cases mentioned by Dr. Dobson, in which the infection was due to the *Megalosporon endothrix*, kerion would have supervened independently of the *x*-ray treatment.

Dr. J. GOODWIN TOMKINSON (Glasgow) said: All the unsuccessful results cited this morning would have been obviated had the regulations laid down by Sabouraud for the treatment of tinea tonsurans been accurately followed. Every point of technique raised in this morning's discussion is referred to by Sabouraud and Noire in their monograph,[1] and exhaustively dealt with. No gauge of dosage other than the pastille should be used, as the conditions of the tube, as pointed out by Sabouraud, vary not only daily, but from hour to hour; hence the only measure of the *x*-rays should be that made at their *exit* from the tube. The possibility of cerebral injury is entirely chimerical, as the vast number of cases treated, not only in this country but in Paris, where ringworm colonies have been suppressed, indubitably prove. If any dependable case of cerebral mischief resulting from such treatment were demonstrated, we might even then hesitate to abandon what is the only reliable method at our disposal. With respect to this method, Sabouraud puts the whole matter in a nutshell in saying, "*C'est vraiment parfaite quand on l'applique parfaitement.*"

Dr. HOWARD PIRIE said: On one occasion I have seen bad effects follow the application of the rays for ringworm. In this case far too big a dose was given. It was my first attempt at complete epilation of the whole scalp. I had on several previous occasions produced epilation of one spot, and I then determined to attempt the whole scalp at one sitting. At that time there was no recognized method of epilating the whole scalp at one sitting that I knew of, and my attempt was not a success. I gave much too large a dose. The after-result is that the child has permanent baldness over a patch of her scalp. It is with regard to the general symptoms shortly after the application that I wish to refer. There was redness over nearly all the scalp and ulceration in parts. The child was weak and in a very low state of health for nearly two months. An intense rash, like severe scarlet-fever rash, came out on the body and limbs. It was raised more than the rash of scarlet fever and rather more discrete. It lasted intensely for nearly a week and then died away slowly. The child is now in good health, though still bald in a patch. Although the dose was such as would never be given by a skilled worker nowadays, yet the child has recovered, and there is no weakness of the brain. The treatment was about four years ago. This is the only case I have seen in which bad effects followed *x*-ray treatment for ringworm, and I have since treated many cases causing complete temporary baldness.

Dr. R. E. HOWELL (Middlesbrough) said: I started ringworm treatment with the *x* rays about two and a half years ago, and my first patient was a medical friend who had unfortunately acquired the disease by infection from a case. We had nothing but theoretical experience of the *x* rays to go upon, but it was quite a successful result except that the hair returned grey in colour. This is the only case I have seen having this outcome, and I should like to know whether it is at all a common experience among other workers.

Dr. S. ERNEST DORE (Evelina Hospital) said: I think we cannot too strongly deprecate the exaggerated reports which have been promulgated in the lay press on this subject. In my experience the effect of ordinary exposures on the brain tissue in the treatment of ringworm is nil. It seems reasonable to suppose that what does not injuriously affect the skin will not affect the underlying cerebral tissue. If the brain tissue were affected at all one might suppose that the immediate effect would take place about the fourteenth or fifteenth day after the exposure, as it is at that time that the epilation occurs. An epilation dose, if it had any effect at all upon the brain cells, would cause symptoms about the date corresponding to the fall of the hair. This, I believe, has never occurred. It has been shown, moreover, that only 20 per cent. of the rays penetrate the skull. Lastly, the large number of children treated—I believe that 3,000 cases have been treated by Sabouraud within five years, and an even larger number by Colcott Fox, in London—without a single ascertained case of harmful effect upon the child's development is the best answer to the alarmist statements which have been made.

Dr. HIGHAM COOPER, in reply, said: Most of the questions raised have been answered by one or the other speaker. Dr. Dobson's experience of the three cases due to the *Megalosporon endothrix* is interesting. I have always believed that the action of the *x* rays in ringworm lay to some degree in inhibiting the activity of the spores themselves and temporarily weakening their vitality. What bearing the question of the particular spore has upon this point I should not like to say. It may depend upon its greater or less vitality. I remember one case in which I had a very acute dermatitis, and being a private case I happen to remember the spore which caused it. It was *Megalosporon endothrix*. The use of germicidal agents is always indicated, especially when patients cannot be depended on to observe personal cleanliness afterwards. I do not think it is so necessary in the case of clean patients. At the Evelina we have a most terrible class of patients in this respect, and it is eminently necessary to use germicidal agents. We have been very much troubled with reinfection, and I think that the case which one speaker mentioned, when temporary alopecia was produced and the cure was not permanent, may be put down to reinfection from some other part of the head. Several speakers have mentioned the texture of the hair after *x*-ray treatment. Professor Wild said that he had often found the hair coarse and wanting in brightness, and someone else noted greyness. As to greyness, this, of course, may be produced by over-exposure. The hairs that grow after slight over-exposure are usually lacking in colour and somewhat brittle. I treated a medical man whose hair came back red, and he was exceedingly annoyed about it. When treating children I notice that usually the hair comes back stronger and thicker than before. I quite agree with Dr. Sequeira that the tachimeter is not a reliable instrument. The points to go upon are primarily the pastille, which should be carefully kept from light during exposure, and the regulation distance. Sabouraud's instructions cannot be carried out too carefully. I have often found people make a mistake by taking a tube of a different diameter from that for which the Sabouraud method was intended. Some workers use tubes with very large bulb, and if the pastille is put too close to the wall of the tube grave injuries may result because of the effect from the tube wall. I do not quite follow the speaker who said that smaller doses were necessary for fine hair. It is fair hair which requires the smaller doses. Of course, fair hair is usually finer than dark, but in this connexion the thing that matters is the colour of the hair rather than its texture. When treating a patient with hypertrichosis the fine hairs on the chin are much more difficult to remove than the coarser ones. Attention has been drawn to the faulty pastilles put upon the market by a certain firm some time ago. These, I believe, have now been withdrawn. I had a very bad case of permanent baldness after using a pastille which was sold to me as Sabouraud's. I always insist now upon getting the genuine Sabouraud. Some time ago a curious consignment of pastilles was sent to me direct from Paris. Immediately on arrival they

[1] *Le traitement des teignes tondantes par les rayons X.*

were placed in the safe in the secretary's room at the hospital, and when I took them out a day or two afterwards and tore off the cover I found that they were distinctly brown in colour. I returned them to the makers, who said that they must have been exposed to the *x* rays, but the *x*-ray apparatus was some hundreds of yards away on another floor. The only conclusion which could be arrived at was that they had been exposed to *x* rays or heat in the post.

OBSERVATIONS ON THE EXISTENCE OF AN IDIOSYNCRATIC SUSCEPTIBILITY TO ROENTGEN RAYS.

By JOHN HALL-EDWARDS, L.R.C.P.Edin., F.R.P.S.Hon.,
Surgeon in Charge of the X-ray Department, General Hospital, Birmingham.

IN the early days of the application of the *x* rays to diagnosis and treatment all ill results produced were accounted for by attributing to the patient a special susceptibility to the action of the rays. In the light of our present knowledge there cannot be the slightest doubt that in by far the greater majority of these cases the result was due to maladministration and over-exposure, and not to any inherent susceptibility possessed by the patient.

The *x* rays were then administered by men who were not only completely ignorant of their properties and effects, but were, moreover, in many instances, untrained in the management of the apparatus used, and ignorant of the first principles of electrical science. We had then no methods of measuring the output of rays, and as a consequence the length of exposure, as measured by the amount of rays absorbed, was an unknown quantity. Many of the early workers were ignorant of the rudiments of photography, and, as is always the case with beginners in this science, they frequently mistook over-exposure for under-exposure, with the result that frequently a second, third, and fourth attempt was made to secure a radiograph by means of a lengthened exposure, when, in the first instance, over-exposure was the direct cause of their inability to procure the desired result.

It can hardly be wondered at that under these conditions numerous cases were forthcoming in which the effects of over-exposure manifested themselves in the form of a radio-dermatitis.

I must admit, as I have previously said, that we had nothing to guide us to the assumption that the effects of such exposures might possibly bring disaster in their path, and some excuse can, therefore, be made for those who attributed to special susceptibility results which were due entirely to unscientific administration. Most of the early workers were forced to admit the existence of idiosyncrasy because they failed to imagine that any other direct and efficient cause could exist.

There exists, even at the present time, much difference of opinion in regard to this question, but there can be little doubt that the reaction produced by a measured quantity of the rays differs in severity in different individuals; and that a limited susceptibility does exist, although this can hardly be said to amount to idiosyncrasy. From the results published of the very early cases of radio-dermatitis, it might be assumed that a dose only sufficiently large to bring about the slightest possible reaction in one individual was capable of producing the most disastrous results in another. That this is not the case we are now well aware, and granting that the rays are administered with skill under perfect conditions, it is now possible to administer a dose capable of producing a desired effect without any fear of greatly transcending it, and we now know that it is impossible to produce in any individual a severe dermatitis by an exposure which in ordinary circumstances is only sufficient to produce a slight erythema. On the other hand, it is impossible by any known means to administer a dose which will produce exactly similar effects in two individuals.

In order to prove the existence of idiosyncrasy, we must be in a position to show that a dose which in one person would be only sufficient to produce a slight erythema may in another individual bring about a severe radio-dermatitis. We are certainly not in a position to prove as much as this, but there can be no doubt whatever that some persons react much more vigorously to the rays than others. Oudin says that in co-operation with Doctor Barthélemy he has made a long series of observations on the question.

> For this purpose we made choice of subjects of the most varied constitution, differing in the coloration of the skin and hair, and also in temperament. These we submitted to irradiations of similar intensity for radiographic purposes. We came to the conclusion that there is no evidence that some individuals have a special vulnerability to the action of the rays. The most that can be said is, of two subjects equally irradiated, the weaker and less resistant will have a little stronger reaction.

Kienbock is of opinion that a special predisposition of the individual plays no part in the question of *x*-ray dermatitis, and that in every case the cause can be traced to over-exposure. He says:

> Apart from slight differences, due to age, the sensitiveness of the healthy skin is the same in all individuals.

Carl Beck does not believe in the existence of idiosyncrasy.

Freund admits that there exists a special susceptibility, but he is not inclined to attach to it so much importance as he did in his earlier experiments. He says:

> There is evidence of a sort of idiosyncrasy, each individual reacting to the rays in a special manner.

Dr. David Walsh says:

> Predisposition of some kind appears to be an absolutely essential factor. Peculiarity may lie in the skin, but it seems more likely to be in the blood, especially as the latter is attracted to the skin in greatly increased volume in response to many external irritant influences. It may be that the focus tube rays, like the sun and other external irritants, stimulate the excretory function of the skin into unusual activity, and that the outward passage of some irritant from the blood sets up the dermatitis![1]

Bearing in mind the fact that some of the effects produced by exposure to an *x*-ray tube in action may be due to the electrically-charged atmosphere which surrounds such a tube, it is interesting to note that Kassabian in his work on electro-therapeutics, has drawn attention to the fact that there exists a special susceptibility of the patient to the static electric current. He says:

> It has frequently been observed that certain patients are unusually susceptible to static electricity. I have seen many cases where a static breeze applied to the head was sufficient to cause fainting, or at least dizziness. For such patients it is necessary to diminish the strength of the current, also to shorten the length and lessen the number of the applications.

In dealing with the subject of special susceptibility and of the production of accidental burns, he says:

> The individual "disposition" is an important factor in the relative frequency of *x*-ray burns, and this disposition varies according to the types of the pigment of the body. Different parts of the body react variously to the rays, the hairy regions being especially sensitive. In an examination of 8,000 patients for diagnostic purposes, I have met with but three mishaps—one case each of epilation, vesication, and ulceration.

Sjörgen and Seaerholm are strongly impressed that blondes and brunettes react differently to the action of the rays, and they publish a table of 13 cases, in each of which from 12 to 35 exposures to the *x* rays were given. Strong and marked reaction was noted in the brunettes, whilst only mild reaction is reported to have occurred in the blondes.

H. Gocht has stated that in the Hamburg-Eppendorf Hospital, out of a total of over 2,000 exposures, there was only one burn.

Albers-Schonberg has stated that he is of opinion that the probability of producing an accidental *x*-ray burn is very small.

Hoffa says that the occurrence of a burn is in the proportion of 7 to 10,000, which small figure (0.7—per cent.) is not obtained in the statistics of even the most harmless operation.

Pusey and Caldwell, in discussing Kienbock's assertion that we are not justified in assuming an idiosyncrasy to the *x* rays, and that all individuals in good health react precisely in a similar manner, say:

> In our judgement there is not the slightest suspicion o evidence to justify such a statement. The very fact that *x*-ray burns are comparatively so few demonstrates in the largest and most convincing way the inaccuracy of such a position.

They go on to state that although at the time of writing millions of *x*-ray exposures had been made, only 170 burns could be found recorded in the literature of the subject.

With the hundreds of thousands of *x*-ray exposures that have been made, is it to be supposed that only 170 cases have been exposed beyond the point of safety? Or even suppose that only 1 in 10 cases of severe burn has come to light, is it to be supposed that only 1,700 cases of over-exposure have taken place? The superstition is an absurdity on the face of it. Probably in one month—three or four months after Roentgen's discovery was announced—over 1,700 cases were exposed in a way that we now know to be dangerous. Many cases of burn have unquestionably been caused by dangerous exposures; on the other hand, it is certainly true that thousands of what are dangerous exposures for some individuals have been made without injury, and the fact that in innumerable cases the individuals have escaped *x*-ray effects, while in a few cases under similar conditions injuries have occurred, can only be accounted for by the existence in a few individuals of certain factors rendering them more susceptible to *x*-ray influence. Such a statement as Kienbock's, founded as it is absolutely upon personal opinion, regardless of recorded facts, needs to be challenged. It is most mischievous in the influence which it may have upon technique; and there are enough *x*-ray injuries due to faulty technique without throwing out so well an established fact as personal idiosyncrasy to account for some of them.[2]

Sabouraud denies the existence of a special susceptibility to the *x* rays, and has stated that he has failed to notice any unfavourable effect, not even a headache, in one out of the large number of cases of ringworm in children which he has subjected to such treatment.

Freund has published an interesting case in which a female patient appeared to be more susceptible to the rays during the menstrual period than at other times.

Dr. Reginald Morton has stated that in his opinion, based on a number of years of observation, an occasional case has been met with in which there was a marked susceptibility to the rays. He could recall three particular cases at the London Hospital in an experience extending over a period of five and a half years, in which an unexpected acute dermatitis occurred.

Gassmann believes in certain differences of sensibility in individual cases rather than in true idiosyncrasy.

With such a marked conflict of opinion before us, it is difficult to decide the true facts of the case. From personal experience, however, extending over a period of ten years, I am convinced that there does exist a special susceptibility on the part of some patients, although I must admit that this susceptibility is far less common than a few years back I thought it to be. Hence, up to quite recently, I have administered frequently-repeated short exposures in preference to resorting to a full-measured dose. That there is reason for this is shown by the fact that the discoverer of the most perfect method of measuring *x*-ray dosage had to pay heavy damages for producing a burn when carrying out his own methods.

In studying the question of chronic radio-dermatitis, I have been struck with the great difference in results shown in different individuals, and quite recently, after the publication of one of my articles on this subject, I received a letter from Mr. Russell S. Wright, of the firm of Messrs. Newton and Co., in which he says:

> I note you remark that as a rule those people are most sensitive who are easily burned by the sun. I am one of the fortunates who did a great deal of work with the *x* rays before any precautions were taken, and yet escaped any injury. In the early days I personally tested almost every *x*-ray tube the firm sent out, and for several months did practically nothing else, holding my hand behind the screen, but although I distinctly remember my eyes badly aching at that time, nothing else ever happened, and my eyesight is in no way impaired.
>
> Curiously enough I am very susceptible to sunburn. An afternoon's cricket is enough very often to peel the skin off my face, and when on a holiday I have frequently had to resort to medical treatment.
>
> With regard to my immunity from dermatitis, I have often wondered at my escape, and have thought that it might have been due to the small tubes we were then using. We were the first firm to take up the original "focus" tube as designed by Professor Jackson, and with the conservatism of an old firm, we stuck to these small bulbs for years after the large German tubes had been almost universally adopted. In fact, all my continuous work was done with these small tubes. I have never seen any mention as to whether the size of the tube made any difference to the danger, but perhaps it would be worth while to look into this question. There is no doubt that soft secondary rays are emitted from the surface of the glass, as well as from the anticathode, and I think it might be worth while trying (if it has not been already done) to see if small tubes are safer than big ones.

Mr. Russell Wright is still engaged in testing *x*-ray apparatus, and I have quite recently examined his hands, upon which I failed to notice any signs of dermatitis. In contradistinction to this case, I would draw your attention to one I have already published, in which an assistant in an *x*-ray laboratory in Australia contracted an acute dermatitis (from exposing his hands during one or two evenings for the purpose of testing various fluorescent screens), which rapidly assumed chronic characteristics, and resulted in the amputation of the limb as a necessity to saving the life of the patient. These two cases differ so widely in the results produced that one must be led to the conclusion that there must exist some factor apart from the actual *x*-ray technique which ought to be taken into consideration.

There can be no doubt that the amount of reaction which follows irradiation is to an extent dependent upon the bodily health of the patient, upon the position of the surface to which the *x* rays are applied, upon the age of the patient, and upon other causes. The question of complexion must not be overlooked, notwithstanding the fact that some investigators take up an entirely different view from others.

I have already mentioned a series of experiments in which it was stated to be proved that blondes are less susceptible to the action of the rays than brunettes. On this subject Belot states that it is a general and accepted rule that the blonde is more susceptible than the brunette. This opinion is also held by Holzknecht. Personally, I find that persons who are particularly sensitive to the sun's rays, be they blondes or brunettes, show the greater amount of reaction. Early pigmentation occurs, as a rule, only in dark people, and, although this to an extent prevents the early appearance of a radio-dermatitis, I find that when the reaction does set in, it is far more marked than in persons who show no tendency to pigmentation.

Pigmentation as a rule disappears after the lapse of time, but I have on record two cases in which the pigmentation appears to be permanent. I look upon early appearance of pigmentation as the danger signal, and always proceed with great caution after its appearance. Some few persons pigment after an exceedingly short exposure. Two years back a gentleman consulted me, and an *x*-ray examination was made with the object of localizing a renal calculus. He was exceedingly stout, and, although the radiograph produced was good, there was evidence of movement due to his coughing during the exposure. I therefore made arrangements to take another radiograph in a few weeks' time when his cough had disappeared. One minute's exposure was given at a distance of about 9 in. from a large German tube having a heavy anticathode, a compressor diaphragm being used during the exposure. On his presenting himself again three weeks later, I was surprised to note a well-marked patch of pigmentation with a clearly defined edge, which corresponded in size and shape to the outlet of the compressor. The patient had not noticed it himself, and had not felt the slightest inconvenience from the previous exposure. As I have not seen the patient again, I am unable to state whether or not the pigmentation has disappeared.

Quite recently a patient presented himself at the General Hospital, Birmingham, for the purpose of being radiographed for renal calculus. On examining his abdomen, I found a well-marked patch of pigmentation covering nearly the whole of the lower half, which had all the appearance of being caused by the constant application of mustard plasters. On my drawing his attention to this fact, he informed me that he had been radiographed nearly five years previously. A lady whose abdomen had been freely irradiated for enlargement of the spleen was tanned a deep brown colour, which showed no signs of disappearance up to the time of her death, which occurred several months after exposure to the rays had been abandoned. In all these cases I learned that the patients were exceedingly sensitive to the effects of the sun, and I have not the slightest doubt that, had an overdose been administered in either case, the reaction would have been most severe.

There is, as a rule, a more marked reaction in fine skin than in coarse, and children are more susceptible to the *x*-rays than adults, while old persons tolerate exposures of greater intensity than could be borne by adults. Though there can be no doubt that the measured dose is the most scientific and accurate method of applying the rays, it has its dangers, and so far I have adopted the plan of

administering a test exposure in order to guide me in arriving at a conclusion as to the degree of susceptibility of the patient before administering the doses which I considered necessary for the proper treatment of the case.

Not only do individuals react differently, but there is a marked difference in the sensibility of the skin in different portions of the body. The portions which are covered with hair are generally accepted as being those which are most sensitive, but inasmuch as the hair can be removed without producing any other form of reaction, I do not consider that this contention is proven, and in my experience the skin of the scalp shows more power of resistance than the skin on other portions of the body. Where the epithelial layer over the skin is thick, such as the palms of the hand and the soles of the feet, the surface is highly resistant, whilst the backs of the hands and the extensor surfaces of the limbs are particularly susceptible. Notwithstanding these facts, I advise that irradiation of the thick skinned portions of the body should be undertaken with great caution, for should an overdose be administered in these parts, the results will be found to be far more disastrous and more difficult to cure than if it occurs in the more susceptible parts.

The skin of the face is, as a rule, particularly sensitive, but there are exceptions which are difficult to account for. Quite recently there has been some discussion as to the danger which exists in exposing the eye to the rays. Personally, as I have previously stated, I have found the eye to be very resistant, and have seen no ill-effects follow long-continued frequent exposures over this organ.

With the improved apparatus at our command and our more accurate technique, I am of opinion that in actual practice there is little danger of producing a radiodermatitis by such an exposure as is necessary to bring about the most favourable therapeutic results, and there is no danger whatever in administering the exposure necessary for producing radiographs for diagnostic purposes. Owing to the free publication of the histories of cases of chronic *x*-ray dermatitis in workers with the rays, the public have been unnecessarily alarmed, and much misconception as to the dangers of the rays is rife. There is not the slightest necessity for the existence of fear, as there is no more danger attendant upon their scientific application—not even as much—than frequently exists in the administration of many drugs now in constant and daily use.

That there does exist a special susceptibility to the rays I am convinced, but granting that proper precautions are taken to avoid unnecessary and marked reaction, there is nothing to deter the careful operator from applying the rays in any case in which he is of opinion that benefit may be obtained. The knowledge of the fact that a special susceptibility occasionally shows itself, is rather an advantage than otherwise, for whilst on the one hand it does not deter the expert from doing his duty, it has, or should have, a deterrent influence upon those who might be inclined rashly to administer the rays without any knowledge of their properties.

Quite recently there has been an animated discussion in the lay papers in which it has been suggested that all sorts of dangers are likely to arise from the free administration of the rays in the treatment of ringworm in children. Questions have been asked as to the changes in the brain which may follow such exposures, and it has been suggested that the continuance of this practice may possibly lead to the wholesale manufacture of idiots and lunatics. So far, we have no cases recorded in which ill-effects have followed this treatment, although ringworm has been treated universally on the Continent by this method for a considerable number of years.

Apart from the allaying of pain, I have failed to note any effect upon the nervous system except in very advanced cases of chronic *x*-ray dermatitis such as my own. That the *x* rays have a marked analgesic action is proven, but the manner in which this result is brought about is at present unknown. Experiments on animals have proved that nervous symptoms only arise after exposures of such a length as would never under any circumstances be administered to a human being.

It is absolutely certain that no effects upon the nervous system can be set up in human beings by such doses as are now administered for therapeutic purposes, or for the taking of radiographs. The effects of the *x* rays upon neuritis and neuralgia are in all probability due to local action and not to any effect produced on the central nervous system.

References.

[1] *The Roentgen Rays in Medical Work*, by Walsh, third edition, p. 213. [2] *The Roentgen Rays in Therapeutics and Diagnosis*, by Pusey and Caldwell, pp. 240-241.

DISCUSSION.

Dr. Howard Humphris (West London Hospital) said that when the *x*-ray tube was excited from a static machine a burn rarely, if ever, occurred during treatment. In the United States, where prolonged treatments were given with tubes excited by this agent, he did not remember any recorded case of a burn—at any rate, any serious one. This phenomenon suggested that the inverse current might have something to do with it, for the current from an induction machine, as opposed to one of the Wimshurst type, was almost entirely unidirectional, and the inverse current was practically non-existent.

Mr. Higham Cooper (Evelina Hospital) agreed with Dr. Humphris. Sabouraud used static electricity. Mr. Hall-Edwards had spoken of pigmentation, and on that point he (the speaker) had noticed that almost invariably he got pigmentation, even with a short exposure, if the patient, at the time of the application, was taking arsenic.

Dr. J. H. Sequeira (London Hospital) said that a student of his had suffered from psoriasis and took arsenic, with the result that the parts irradiated six weeks afterwards showed a slight pigmentation. With regard to Sabouraud, he believed that the French investigator had burns when carrying out some of his *x*-ray epilations at the time when he was trying to discover the effect of the pastille. Not only had he burns but also persistent alopecia. But he did not think that he had had any since.

SOME PRACTICAL USES OF STATIC ELECTRICITY.

By F. Howard Humphris, M.D.Brux., F.R.C.P.Edin.,
Clinical Assistant, *X*-Ray Department, West London Hospital.

Two years ago I had the privilege of reading a paper before you on the Rationale of Static Currents.[1] To-day I propose to show how those principles apply in certain painful conditions. Static currents—that is, currents derived from a powerful static machine—find their greatest sphere of usefulness in the relief of pain, and this is due to the fact that almost every pain is caused or accompanied by some congestion or stasis, and, to quote Dr. Snow, who has done so much work in this subject, "Nothing so thoroughly overcomes the area of congestion as the static high-potential currents."[2] In static electricity we have an agent which gives patients immediate relief from pain in such affections as neuritis, lumbago, and other myalgias, and in synovitis. The pathology of lumbago is at present uncertain, but in my opinion static electricity drives out from the muscle tissue some infiltration which is causing a temporary stasis and giving rise to the pain.

When, however, we come to sciatica or any other neuritis, we have a definite pathology. We have a hypertrophy of the neurilemma, with a multiplication of new tissue elements and the presence of migrated leucocytes; this causing compression of the nerve tubules, pain naturally results. When we apply the Morton wave current over the affected area and separate the spark gap, we get a rhythmical tissue contraction, not only of the skin and muscle, visible to the eye, but also of the invisible tissue beneath, of the muscular wall of the arteries and arterioles, and even of the most minute particles of protoplasm. The current produces a cellular, protoplasmic massage under the influence of which stasis cannot exist, and the fluids from the infiltrated area are expressed, and with their dispersion there comes relief from the pain. And not only is the congestion temporarily removed, but this forced cellular activity paves the way for an improved state of metabolism, and therefore less tendency to the return of the pain. Not only do we get this local effect, but there is also an alteration in metabolism, as seen by an increased excretion of urea, an increase of perspiration, accompanied by lowering of arterial tension and a general

feeling of *bien-être*, all of which tend to relieve or prevent further trouble.

The details of the treatment are as follows: In the first place, let the patient indicate the seat of the maximum intensity of the pain; over this area place a piece of Crookes's composition—a soft metal combination of tin and lead—somewhat larger than the area the patient has marked out. At the back of this place an indiarubber bag, filled one-third with warm water; attach the electrode to one side of the positive side of the machine, and get a ground connexion for the negative side. The spark-gap being closed, the machine started, and everything in readiness, the spark-gap should be cautiously and slowly opened, for at the beginning of the treatment pain as well as the resistance of the skin will prevent the patient taking much current. After the first moments a toleration more or less marked will be established, and the spark-gap should be lengthened accordingly; a 10 to 12 in. spark, not too fast, will often be easily borne. This should be administered for twenty minutes. At the end of this time the patient will be usually free from pain. The effects of a single administration are very gratifying to the patient.

The application should be repeated according to the length of time in which the pain returns. Sometimes it is necessary at the beginning to see the patient twice a day, but as a rule once daily is sufficient, and usually after the first six or seven days the use of the current three times a week will keep the pain away, and finally subdue it altogether. Pain is relieved from the first, and the total time taken to effect a cure would seem to depend upon the length of time that the disease has existed. There are some cases in which the patient will not stand the wave current; the brush discharge may be tried, but I have found that it does not compare favourably with the wave current in prompt efficacy. In some obstinate cases the indirect spark may be given, and this will often relieve the pain instantaneously.

The third and last condition to which I shall draw attention to-day is synovitis. The synovial membrane is perhaps more ready to inflame than any other tissue in the body, and with inflammation comes serous effusion. The majority of joint affections in adults begins in the synovial membrane; at the commencement there is an inflammatory congestion evidenced by loss of its polish, then the membrane becomes injected and thickened. The synovia is increased in quantity and mixed with inflammatory exudation, which is poured out with it. Time will not permit me to trace out the anatomical changes which take place when the disease begins in the bone, cartilage, ligaments, or soft parts in connexion with them, but in all of these we have stasis.

In static electricity we have an agent which will dispel that stasis and promote the absorption of the products. "If," says Erichsen, "the disease progress favourably, these products are completely absorbed."[3] Now, static electricity, by its macroscopic and microscopic massage, hastens the absorption of morbid products, and so compels the disease to progress favourably. The details of the application are as follows:

The anterior surface of the joint, or indeed all of it, is covered with a thin sheet of Crookes's composition, and made to fit the joint as accurately as possible. Sometimes, where good apposition is difficult, a canvas bag filled with kaolin, to which is sewn a piece of metal, will be found less painful and more adaptable to the uneven surface. This is attached to the positive pole and the negative is grounded as before. The number of applications required depends entirely upon the extent of the anatomical changes taking place, and should be continued until all pain and swelling have subsided and the patient is of the opinion that the injured joint is as good as it was before the trouble commenced.

The disrupto-convective current, or brush discharge, I have found very useful in these cases, especially with nervous or timid patients. Here the platform is connected with the negative side of the machine, while the positive side, as well as the wooden electrode (or it may be an ordinary whisk broom) is attached to two separate groundings. Each application of electricity should last for twenty minutes, and after each the patient experiences definite and decided relief. In joint affections the wave current is a valuable diagnostic agent, for while sprains, synovitis, gouty and rheumatic affections are improved by it, malignant disease, tuberculous and streptococcic infections are either uninfluenced or made worse, the treatment giving rise to much pain.

In conclusion, I would urge the claims of static electricity in the treatment of these painful affections as being rational and effective. Rational, for, depending on stasis as they do, we have in static electricity a powerful agent which will disperse that stasis; effective, since it relieves the pain. Static electricity is effective from its first application; one has not to wait and assure the sufferer that the pain will improve with continued treatment. To the patient the result is satisfactory and immediate, and we know that with the relief of pain we must have relieved that which was causing the pain.

REFERENCES.

[1] BRITISH MEDICAL JOURNAL, September 7th, 1907. [2] *Static Electricity and the Use of the Roentgen Ray* (Chatterton). [3] *Science and Art of Surgery*, vol. ii, p. 327.

DISCUSSION.

The PRESIDENT mentioned a case of very severe neuralgia which had come within his knowledge as having been cured by static electricity. He questioned whether the British climate was suitable for this modality.

Dr. F. H. MUNROE (Newark, U.S.A.) said that it gave him great pleasure to confirm the statements made by Dr. Humphris with regard to the use of static currents in the relief of congestions and stases and pain. In America they were now using these currents largely, and with good effect. He would like to mention one very troublesome condition—namely, prostatitis—which nine times out of ten would yield to the static wave current by rectal electrode. The results in such cases were all that could be desired. The field was practically inexhaustible, and the results positively brilliant.

Dr. JAMES METCALFE (Bradford) congratulated Dr. Humphris on having drawn attention to this subject. He himself had had considerable experience of this form of treatment during the past six years. Personally, he rather thought that where the condition was essentially due to a deficiency of metabolism high frequency currents were the more advisable, but when the trouble was due to a nerve lesion the static currents were the currents *par excellence* to be used in treatment. He quoted a case of periodic neuritis in a gentleman, occurring constantly in the course of several years. He suffered from the pain in the intercostal nerves with a violent gastralgia. The pain came on every three or four hours day and night, and was a source of great misery to the patient. He had been treated by all the recognized methods, but did not receive relief until after the static applications. He had now been cured for over two years. A second case was that of an intractable neurasthenia of seven years' duration. Insomnia, anorexia, melancholia, and a general feeling of misery were constant symptoms. After twenty applications of a general static bath, the patient was entirely cured, and had remained in perfect health for over two years. Cases of Bell's and post-diphtheritic paralyses were also quoted in which the patients were rapidly cured by static applications, general and local. He urged that this form of treatment should be more frequently adopted in this country, especially in cases in which ordinary therapeutic methods were unsuccessful.

Dr. HOWARD HUMPHRIS, in reply, said that he quite concurred with Dr. Munroe when he said that the field for static electricity was practically inexhaustible and that the results were brilliant. He (Dr. Humphris) had yet to meet any observer who, after honestly studying the question, and having the two essential requisitions—a powerful machine and an adequate knowledge of static electricity—held a contrary opinion. Dr. Metcalfe rightly said that it would be possible to quote many cases. The art of static electricity was long and the time of the Section was short, so he would conclude by thanking the members for the attention which they had given to a subject which probably had small personal interest for the majority of medical men.

"X" RAYS IN GYNAECOLOGY.

By E. B. HAZLETON, M.D., R.U.I., L.R.C.P.,
Sheffield.

As very little attention appears to have been given in this country to the treatment of the diseases peculiar to women by the *x* rays, I propose to place before you a short summary of results obtained by Continental workers, and to draw certain conclusions from the published accounts of their technique.

There has always been a certain amount of dissatisfaction amongst Roentgenologists generally with the technique of Roentgen irradiation as hitherto practised in gynaecology. I allude to the application of the *x* rays to the uterus or uterine tumour through a speculum.

It is evident that a large portion of the cone of rays must be cut off by the speculum, and that a very small movement on the part of the patient will cause the distal end of the speculum to take up a faulty position.

An improved method of application has been inaugurated by Foveau de Courmelles in France, followed by Lengpelzer, Görl, Fraenkel, and notably Albers-Schönberg of Hamburg.

The technique consists in irradiating the uterus through the abdominal parietes. Dr. Albers-Schönberg recommends the following: The patient is laid horizontally on a couch, a compression cylinder of a diameter usually of 13 cm. is used, and the endeavour should be to irradiate the tumour and the uterus only, avoiding irradiation of the intestines.

Between the skin and the compression cylinder is placed a screen to filter out the soft rays. The screen is composed of six layers of tinfoil interposed between four layers of thin kid leather, each 1 mm. thick.

The focus tube should be kept at a hardness of 6 to 8 on Walters scale, and a current of 4 to 5 milliampères passed through it.

At a distance of 38 cm. tint B of Sabouraud and Noiré, or 5 H, is obtained in four sittings of six minutes each. If such a series is given twice a month the maximum dose of 10 H per month will not be exceeded.

Roentgen treatment on the above lines is indicated in all cases for which hitherto the only satisfactory cure has been extirpation of the uterus.

Excellent results have been obtained in cases of myoma, molimina menstrualia, metrorrhagia, and menorrhagia of the climacteric period.

Fraenkel reports good results in 28 cases of menstrual troubles treated by the *x* rays.

In cases of leucorrhoea the discharge ceased in a short time after the irradiation, without further treatment.

On reading accounts of these cases it may be noticed that one frequent result of irradiation of the uterus for myoma and other pathological conditions has been atrophy of the ovaries with consequent cessation of menstruation.

It has occurred to me to make use of this fact in connexion with some patients who have deformed pelves, and on whom the operation of craniotomy has been performed. Hitherto, in cases where natural labour is impossible, owing to a rachitic or otherwise deformed pelvis, one of the following methods of treatment has been followed—namely:

The induction of premature labour.
Symphysiotomy.
Craniotomy.
Caesarean section.

We are now, however, in a position to offer to the patient with contracted pelvis, for whom the birth of a living child is impossible, another form of treatment—namely, that of the *x* rays, by which we are enabled to produce atrophy of the ovaries, and thus permanently relieve her mind of all further dread of conception, and the resulting necessity for operative procedures. The *x* rays may thus be used as a substitute for oöphorectomy.

It also appears probable that many tumours of the ovaries might be beneficially treated by irradiation, as, for instance, the early stages of proliferating cystoma; also fibroma and myoma, while the action of the rays on dermoid cysts of the ovaries would be at least to arrest if not to cause a retrogression of their growth.

DISCUSSION.

Mr. HIGHAM COOPER (Evelina Hospital) asked whether Dr. Hazleton was sure that atrophy of the ovaries could be produced by the *x* rays. He had treated several cases of fibroma of the uterus, and in cases of malignant growth which had been treated with the *x* rays, the ovaries being most extensively irradiated, there was no sign of an atrophic condition at a subsequent *post-mortem* examination. Yet in certain instances the irradiation of the ovaries had extended over a period of nearly a year.

Dr. HOWARD HUMPHRIS (London) said that in all cases of inoperable uterine cancer the patient should be strongly advised to submit to systematic radiation. He had seen several such cases, one of which would always stand out prominently in his mind. The patient was an elderly woman, with whom the surgeons refused to interfere. She had intense pain, haemorrhage, and a foul discharge. The pain was relieved at the first radiation; the next day the discharge was less foul, and the haemorrhage diminished. At the end of two weeks the patient was comfortable, and her appearance markedly improved.

Dr. HAZLETON, in reply, said he had a letter from Dr. Albers-Schönberg in which he said that he had certainly produced atrophy of the ovaries by means of the *x* rays. Judging from the action of the rays on the testicles, one would imagine that the ovaries would be affected in a similar manner. He proposed to carry out some tests upon dogs.

DEMONSTRATIONS.

AMONG cases exhibited during the meeting were the following:

The PRESIDENT (Dr. Calwell): (1) A case of adenoma sebaceum (with microscopical sections); (2) a case of pityriasis rubra pilaris in its early stages. He also exhibited a water-colour drawing of a case of erythrodermia with lymphocytosis, which ultimately became one of pityriasis rubra.

Dr. CAMPBELL RANKIN: Three cases, one of xerodermia pigmentosa, another of epithelioma of wrist and senile keratosis of face, and a third of lupus vulgaris, to show the results of plastic operation on the nose.

Dr. J. MCLEISH: A case of lupus vulgaris.

Dr. STOPFORD TAYLOR and Dr. MACKENNA (Liverpool): Casts and photographs of skin diseases in the museum of the college.

The proceedings concluded with a vote of thanks to the President.

Dr. CALWELL, in reply, said that thanks were due to the honorary secretaries of the Section, Dr. Sequeira, Dr. Dore and Dr. Rankin.

SECTION OF HYGIENE AND PUBLIC HEALTH.

LOUIS COLTMAN PARKES, M.D.Lond., President.

PRESIDENT'S OPENING REMARKS.

DR. LOUIS PARKES, in initiating the work of the Section, said that one of the most interesting problems of the present day was the urbanization of the population. That urbanization led to several serious evils, the most serious of which was the deterioration of the physique of the people. There was also the question—rather a political one—of the multiplication of unskilled and casual labour that urbanization led to, which was undoubtedly a cause of deterioration. As medical officers of health, those present were chiefly concerned with the improvement of town life. They might say, without boasting, that a great deal had been done in the way of improving housing, drainage, and water-supply, and the death-rate had been greatly reduced. There had been a very notable reduction in infectious diseases and in some chronic complaints, such as tuberculosis. Up till a short time ago the rate of infantile mortality had not shown any improvement, but within the last four or five years a decided effort had been made to reach the working-class mother, and there had been a drop in infantile mortality from 140 to 105 per 1,000. It was a question how far that

decline was due to human efforts or to the exceptionally cool, showery summers of the last four or five years, but he thought something had been done by health visitors. There was still one feature in which cities were behind the country. That was in the air the people had to breathe. Impure air was very largely responsible for physical deterioration. Something, of course, was due to the prejudice amongst the lower classes against ventilation, but he was glad to say that the open window at night was becoming more popular. In Ireland, by such societies as the Women's National Health Association, of which Lady Aberdeen was President, the common-sense of hygiene was being taught to the people. The late Professor de Chaumont, as a result of his experiments, had shown that there should not be more than 6 parts of carbon dioxide in 10,000 parts of air; but so defective were the conditions in factories and workshops that a Departmental Committee of the Home Office allowed as much as 12 parts of CO_2 per 10,000. That showed that the conditions in factories were not such as could meet with their approval. An enormous number of their fellow-citizens had to live in an atmosphere in which the pure air supply was only one-third of what it should be. The real improvement in the air of towns as regarded freedom from air pollution would not come from legislation, but from economical causes. In London there had been a great improvement in the atmosphere, not only in summer, but also in winter, and that was very largely due to the fact that more people were using gas for cooking purposes. There was also the fact that architects of large buildings were taking up the question of central heating by hot water or steam without the use of open fireplaces, though he thought more attention should be paid by them to ventilation. They should look forward to the adoption of these methods of heating for all large buildings, and with that and the introduction of gas for both heating and cooking, a considerable improvement would take place in the air of towns.

With regard to tuberculosis, it was a question how much tuberculosis amongst the young was due to milk and how much to insanitary homes. Superficially, one would think there was not much in the milk question, because it was the children of the poor, and not the children of the rich, that suffered from tuberculosis. It was quite possible, however, that children of the rich suffered from the deposition of tubercle, but that owing to their better conditions of life and greater resisting power, they were able to throw off the infection. Another question was, What was the capacity of tubercle for remaining latent in the system, and what was the determining cause of the disease manifesting itself at a later period? Research should be undertaken with a view to finding out the facts in regard to these points.

In conclusion, the President expressed his thanks and those of his colleagues to Their Excellencies for honouring that Section by a visit. They believed that by the efforts of such associations as that over which Lady Aberdeen presided they would be able to reduce the death-rate from tuberculosis in Ireland to something like the figures for England and Scotland.

NOTIFICATION OF TUBERCULOSIS OF THE LUNG IN SHEFFIELD,

AND THE INCIDENCE OF TUBERCULOSIS ON MALES, FEMALES, AND CHILDREN IN VARIOUS TOWNS.

By H. SCURFIELD,

MEDICAL OFFICER OF HEALTH, SHEFFIELD.

I PROPOSE to give a short account of the use which is at present made in Sheffield of the information obtained by the provisions of the Sheffield Corporation Act, 1903, by which tuberculosis of the lung is compulsorily notifiable.

In order to facilitate notification the Corporation has made arrangements with the Bacteriological Department of the University of Sheffield for the examination of the sputum from a person who is suspected of having tuberculosis of the lung; 1,518 specimens were examined last year, at a cost of £196.

Two special inspectors are engaged in visiting houses where cases of consumption are notified. On his first visit the inspector obtains as much of the history of the case as possible. He leaves a copy of printed "advice" with the relatives or with the patient. He particularly insists on the benefits of keeping the windows open as much as possible, and supplies the poorer of the patients with pocket spittoons free of charge. The pocket spittoons are of simple pattern, and consist of blue-glass flasks with rubber bungs, and are supplied by Messrs. Beatson and Co., of Rotherham, at £2 17s. per gross. The inspector revisits at regular intervals, and in all cases where the house is dirty or the patient is much confined to the house by his illness he disinfects the room at the time of his visit with a formalin sprayer. It is generally possible to get the patient to vacate the room for the time necessary for the disinfection being carried out. The inspector, of course, advises that the room should be as free from hangings, etc., as possible.

In a small number of cases, about 1 to 2 per cent., the medical man at the time of notification expresses the wish that the inspector should not call. This request is acceded to on condition that the medical attendant takes upon himself the responsibility of giving all the necessary instructions with regard to precautions for avoiding the spread of infection. The medical attendant is also asked to fill in a form giving some particulars with regard to the history of the case.

The Corporation has now provided hospital accommodation for both males and females. A house standing on an elevated site in the city, with about 1½ acres of ground, has been adapted for sanatorium treatment for 20 males. There is a garden in which the patients who are able to work are employed for so many hours a day, according to their strength.

The principal objects of the hospital are as follows:

1. For the purpose of teaching the patients to live an open-air life, to use pocket spittoons, and generally to take such precautions as will minimize the danger of the spread of infection when they return home.
2. For the purpose of giving the relatives a rest and enabling the homes to be thoroughly disinfected.
3. For selecting such cases as may be found suitable for sending to a sanatorium.

No cases are sent on to a sanatorium until they are fit to do some hours of gardening daily.

At the beginning of May of the present year the small-pox hospital was opened for the reception of female consumptives on similar lines. It is not intended that the patients should remain in the hospital for more than a few weeks.

In admitting cases to the Corporation hospitals we do not stipulate that the sputum should have been examined and found to contain tubercle bacilli. In most cases up to the present time, however, the sputum has been examined, with a positive result. If we made this an absolute *sine qua non* we would be putting obstacles in the way of sanatorium treatment of cases at the earliest stage, as it is generally recognized that the presence of tubercle bacilli in the sputum is evidence that there is some breaking down of the lung in progress, and that the disease is not absolutely in its earliest stage.

If patients are thought suitable for sanatorium treatment they are usually sent away for a period of about four months. Cases have been sent from Sheffield to various sanatoriums. At present there is a considerable number of Sheffield patients at the convalescent home at Withernsea, half of which is devoted to the use of consumptives.

The hospital for males was opened on June 22nd, 1908, so that we have not been greatly faced with the difficulty of finding work for the consumptives after their discharge from the sanatorium. There is no doubt that this will be a great difficulty. It is hardly necessary to point out that the difficulty will be greatly decreased when a proper system has been devised for providing against the unemployment of healthy workers. It stands to reason that while it is difficult to find work for a healthy unemployed, it must be ten times more so to find work for the consumptive unemployed. There are, however, many consumptives who can return to their ordinary occupation without having to learn a new one.

Hospital treatment on modern lines is also provided for consumptives at the Sheffield Royal Infirmary, and at the hospitals belonging to both boards of guardians. The cases that come into the hands of the boards of guardians

are generally too far advanced for sanatorium treatment. Arrangements have been made with the other hospitals by which cases thought to be suitable for sanatorium treatment may be sent to the Corporation hospitals, and subsequently to a sanatorium if found to undergo the work test satisfactorily.

By means of a conference between the various medical men concerned, arrangements have been made by which similar instructions will be issued to prevent the spread of the infection in the case of all patients, whether treated at the Corporation hospitals, the Royal Infirmary, or the workhouse hospitals. At all institutions they will be supplied with similar pocket spittoons, and taught to clean them in the same way.

In passing, I may draw attention to the fact that since the notification of consumption was adopted, and the public have been taught that the disease is infectious, an increased effort has been made to get the poorest consumptives to enter the workhouse hospitals. This is shown by the following table, which gives the percentage of consumptives dying in the workhouse hospitals during recent years.

The percentage of deaths from phthisis which have occurred in hospital has gone up from 11.2 in 1889 to 38.2 in 1908.

Phthisis Mortality in City and Workhouse Hospitals.

Year.	Number of Deaths from Consumption in Workhouse Hospitals.	Number of Deaths from Consumption in the City.	Percentage occurring in Workhouse Hospitals.	Death-rate per 100,000 from Consumption in Sheffield.
1889	62	552	11.2	168
1890	75	618	12.1	192
1891	81	551	14.7	169
1892	59	459	12.9	139
1893	74	552	13.4	165
1894	72	502	14.3	147
1895	76	473	16.1	136
1896	56	453	12.4	128
1897	90	522	17.2	146
1898	98	448	21.9	123
1899	117	502	23.4	136
1900	135	539	25.0	143
1901	142	580	24.5	141
1902	121	491	24.6	117
1903	142	560	25.4	134
1904	154	536	28.7	124
1905	133	486	27.4	110
1906	126	452	27.9	101
1907	146	521	28.0	112
1908	214	560	38.2	121

In considering the table, it has to be remembered that voluntary notification was begun in November, 1899, and compulsory notification came into force in November, 1903.

The information obtained by the inspector on his visits is used in other ways. Of course, if there is any sanitary defect about the home of the consumptive, it is reported to the district inspector of nuisances, who deals with it in the ordinary way. The place where the consumptive works is ascertained, and the information passed on to the workshops inspector. The workshops inspector visits the place of work with a dual object—first, to see if there are any sanitary defects, such as darkness or bad ventilation; and, secondly, to see if the consumptive at his work is so placed as to be a danger to his fellow-workers. If the consumptive works at a factory, and there are sanitary defects which require to be dealt with, the matter is reported to H.M. Inspector of Factories.

The inspector also ascertains the particulars with regard to the family history, and if there are any delicate children attending school. The delicate children in the family of a consumptive are reported to the school medical officer, who pays particular attention to them on his visit to the school. An open-air school has just been opened for dealing with delicate children, and it ought to be possible by means of this system to deal with children belonging to consumptive families at a very early stage.

In the six years that have passed since the Compulsory Notification Act came into force in Sheffield there has been no opposition on the part of the public or the medical practitioners. I have no doubt that there has been some little failure to notify on the part of the medical practitioners. This, however, is only what one would expect with a new Act.

The following is a statement of the number of deaths from consumption in the city of Sheffield, together with the number of persons who have died without being notified in the eleven half-years which have elapsed since the Act came into force:

Period.	No. of Deaths from Tuberculosis of the Lung.	No. of Persons who have Died from Tuberculosis of the Lung without being Notified.
Nov. 1, 1903, to April 30, 1904	315	19
May 1, 1904, to Oct. 31, 1904...	241	19
Nov. 1, 1904, to April 30, 1905	272	19
May 1, 1905, to Oct. 31, 1905...	232	11
Nov. 1, 1905, to April 30, 1906	217	13
May 1, 1906, to Oct. 31, 1906...	211	19
Nov. 1, 1906, to April 30, 1907	285	21
May 1, 1907, to Oct. 31, 1907...	240	20
Nov. 1, 1907, to April 30, 1908	306	12
May 1, 1908, to Oct. 31, 1908...	235	11
Nov. 1, 1908, to April 30, 1909	320	15

The provisions of the Act are being carried out smoothly and without friction, and I am of opinion that the work is doing a considerable amount of good; but it is too soon to speak as to any effect on the death-rate.

There are various matters in the Sheffield scheme which I have just described which require comment.

The visiting of the consumptives is done by male inspectors. The success of the visiting has no doubt been largely due to the tactfulness of the senior inspector. All patients are examined before admission to the Corporation hospitals in order to avoid taking in moribund cases. The inspector notifies the patients who are to come up for examination, and also attends on the examination day, and does everything possible to keep up friendly relations with the patients and their relatives.

Other authorities may prefer to employ only medical men or qualified nurses for the visiting of consumptives. I can only say that the employment of male inspectors for this purpose has worked quite satisfactorily in Sheffield. Owing, however, to the large number of consumptives on the list the revisiting is not carried out sufficiently frequently, and an increase of staff is necessary. The inspectors wear a uniform of an inconspicuous character. Theoretically this may be objectionable; in practice it has not been found so.

As regards sputum prophylaxis—most of the consumptives are supplied with pocket spittoons free of charge. While in the Corporation hospitals they are taught how to cleanse them. In some cases no doubt the patients do not continue to use them, even after being drilled in hospital, as they are afraid of making themselves conspicuous. I am inclined to think that later on it will be necessary to obtain powers to prohibit consumptives from spitting, except in spittoons.

I am strongly of opinion that, if notification is made compulsory, hospital treatment and sanatorium treatment should be provided for suitable cases, to compensate the consumptives for being put under discipline. If this assistance is provided I think it is reasonable to enforce sputum prophylaxis. An additional provision is also needed requiring the patient to notify a change of address. If this is not done several of the notified consumptives temporarily disappear from the "ken" of the health

office. At present we supply postcards to the patients for notifying changes of address, but have no power to compel the use of them.

As regards the sanatorium treatment, two points seem to be of great importance. The first is, that the patient should be taught to cleanse his own spittoon so that he may acquire the habit and continue it after leaving the sanatorium. The second is, that the principle of "working" the patients should be developed. For some time it has been recognized that unless work was provided for the patient there is considerable risk that in curing a consumptive you may create a "loafer." A recent visit to Frimley Sanatorium shows that we have now got a stage further, and that graduated labour is to be regarded as "medicine" for the consumptives. I do not think sufficient importance has been attributed in this country to the work of Dr. Paterson, of Frimley, and I would recommend all who are interested in the subject to visit Frimley and see what is being done there.

In order to make the Sheffield scheme more complete I think it would be advantageous to adopt what is known as the "march past of the contacts" of the Edinburgh Dispensary scheme. When a consumptive is reported in Edinburgh, a medical man visits and examines all the other members of the family for the purpose of detecting early cases.

In the second part of my paper, I wish to put in a plea for the study of the varying manner in which local populations are affected by tuberculosis as regards the mortality among males, females, and children under 5.

My interest in this subject has been aroused by the peculiarities of the Sheffield death-rate. There is nothing suggestive about the Sheffield total tuberculosis death-rate, but when it is split up we find that the male rate from phthisis is much bigger than the English rate and the female rate is much smaller. A further study of the matter shows that over 25 years of age nearly three men die from phthisis to one woman. It is also found that it is only after 35 that the death-rate among men from phthisis becomes excessive, and that among women the phthisis death-rate is only excessive at age periods beyond 55. Further investigation shows that the excessive death-rate among the Sheffield males is due to the excessive prevalence of phthisis among the grinders, and to a less extent among the cutlers. A census of these workers has recently been taken by the Home Office and the death-rates are shown in the following table. The populations of the other workers are based on the 1901 Census.

Mortality in Certain Trades among Male Workers during Seven Years (1901-7) from All Causes and from Phthisis and Diseases of the Respiratory System.

Trade.	Workers.		Mortality.					
			All Causes.		Phthisis.		Respiratory Diseases.	
	No.	Age.	No.	Rate per 1,000 Living.	No.	Rate per 1,000 Living.	No.	Rate per 1,000 Living.
Grinder..	3,868	18 and over	837	30.9	407	15.0	153	5.6
Cutler ...	3,889	18 and over	816	30.0	162	6.0	190	7.0
Tailor ...	941	15 and over	141	21.4	9	1.4	27	4.1
Printer...	487	20 and over	59	17.3	13	3.8	9	2.6
Joiner ...	2,286	15 and over	223	13.9	28	1.7	41	2.6
All males (years 1905-6-7)		20 and over		16.2		2.6		2.1

Although nearly half the grinders die from phthisis, the average age of the grinder at death during recent years has been 50. This seems to suggest a long preliminary period of exposure to dust inhalation before the worker becomes infected with tuberculosis. The slight excess found among women in Sheffield at advanced ages may be due to the wives becoming infected by their husbands at a still more advanced age.

By the courtesy of the medical officers of health I am enabled to give two tables showing an analysis of the death-rate among males, females, and children from tuberculosis, in many of the provincial and metropolitan boroughs, the English rates being also given for the purpose of comparison.

For the purpose of avoiding errors caused by different ideas as to certification or different methods of classification it might have been better to have given simply the total male and female and children's tuberculosis death-rates. The two former, however, can be readily constructed from the table, and the total children's rate is

Tuberculosis of the Lung (including Phthisis) and Other Forms of Tuberculosis in England and Wales and the Large Towns with over 100,000 Population, also in Four Largest Scottish Towns. Average Mortality-rates per Annum per Million Persons living during Ten Years 1898 to 1907 (except where otherwise stated).*

Towns.	Estimated Population (1907).	Tuberculosis of Lung.		Other Forms of Tuberculosis.			Remarks.
		Males (All Ages).	Females (All Ages).	Males (All Ages).	Females (All Ages).	Children (Under 5).	
England and Wales	34,945,600	1,445	1,033	582	487	2,839	
Birkenhead ...	118,441	1,611	1,240	336	234	1,820	
Birmingham ...	553,155	1,818	886	494	394	2,354	4 yrs., 1904-7.
Blackburn ...	134,438	1,330	883	737	572	3,956	
Bolton	182,917	1,748	1,094	471	344	2,549	
Bradford ...	290,323	1,616	920	561	420	2,550	8 yrs., 1900-7.
Brighton ...	129,023	1,889	1,021	657	437	3,062	
Bristol	367,979	1,233	981	—	—	1,681	3 yrs., 1905-7.
Burnley	103,947	1,568	1,145	446	336	2,627	
Cardiff	187,620	1,341	1,162	660	585	2,976	
Croydon ...	154,342	1,293	781	528	432	2,605	8 yrs., 1900-7.
East Ham ...	136,421	827	718	419	437	2,070	7 yrs., 1901-7.
Gateshead ...	125,783	1,623	1,199	588	488	2,557	6 yrs., 1902-7.
Hull	266,762	1,287	997	560	446	1,990	
Leeds	470,268	1,675	1,028	801	671	4,337	
Leicester ...	236,124	1,523	990	571	402	3,015	
Leyton	120,000	1,161	745	478	367	2,191	5 yrs., 1902-4, 1906-7.
Liverpool ...	746,144	2,055	1,361	662	524	3,239	
London	4,758,218	2,075	1,168	668	515	3,681	
Manchester ...	643,158	2,433	1,425	800	655	4,265	
Norwich ...	119,191	1,474	994	863	640	4,661	
Nottingham ...	257,492	1,581	1,025	581	398	2,907	
Oldham	141,730	1,987	1,202	605	465	2,813	
Plymouth ...	120,063	1,443	1,201	681	522	2,980	
Portsmouth ...	208,291	1,696	1,289	373	249	2,235	5 yrs., 1903-7.
Salford	236,670	2,189	1,333	860	648	4,526	
Sheffield ...	455,553	1,756	769	661	564	3,721	
Southampton ...	119,745	1,644	1,004	522	455	3,028	
South Shields ...	113,460	1,756	1,365	792	697	3,246	
Stockport ...	100,986	1,655	1,170	699	652	3,961	8 yrs., 1900-7.
Sunderland ...	155,859	1,664	1,337	834	711	3,887	
West Ham ...	302,484	1,523	1,007	664	571	3,160	
Willesden ...	144,376	1,087	856	422	326	2,053	
Wolverhampton	101,500 (1906)	1,162	643	545	436	2,406	5 yrs., 1902-6.
Aberdeen ...	174,579	1,452	1,405	782	617	3,328	
Dundee	165,748	1,785	1,834	1,099	764	4,647	
Edinburgh ...	345,967	1,753	1,239	824	637	4,360	
Glasgow ...	847,584	1,856	1,665	944	793	4,377	

* Eight of these towns were unable to supply the statistics asked for.

Tuberculosis of the Lung (including Phthisis) and Other Forms of Tuberculosis in the Administrative County of London and Certain of the Metropolitan Boroughs. Average Mortality-rates per Annum per Million Persons living during Ten Years 1898 to 1907 (except where otherwise stated).

Boroughs.	Estimated Population.	Tuberculosis of Lung.		Other Forms of Tuberculosis.			Remarks.
		(Males All Ages).	(Females All Ages).	Males (All Ages).	Females (All Ages).	Children (Under 5).	
Administrative Cty. of London	4,758,218	2,075	1,168	668	515	3,681	
Battersea ...	181,736	1,638	1,108	605	440	2,657	
Bermondsey ...	127,856	2,417	1,364	789	728	4,561	4 yrs., 1904-7.
Chelsea	74,857	2,231	1,062	467	412	3,082	7 yrs., 1901-7.
Hampstead ...	91,137	1,081	572	401	248	2,278	
Islington ...	347,017	1,901	1,134	494	378	3,010	
Kensington ...	180,500	1,703	883	689	413	4,081	
Lewisham ...	152,532	1,118	685	459	331	2,181	6 yrs., 1902-7.
Paddington ...	149,542	1,485	791	530	377	3,084	
Shoreditch ...	114,700	2,588	1,512	1,005	799	5,191	
Southwark ...	209,781	2,891	1,723	756	683	4,092	7 yrs., 1901-7.
Stoke Newington	51,247	1,666	938	612	318	3,117	7 yrs., 1901-7.
Wandsworth ...	325,850	1,197	820	477	324	2,503	
Woolwich ...	129,336	1,632	1,134	458	406	2,058	5 yrs., 1903-7.

Thirteen only of the metropolitan boroughs were able to supply the statistics asked for.

not appreciably altered by the addition of the small number of phthisis deaths which are certified under 5 years of age.

In the English population it will be noticed that:

1. The male death-rate from tuberculosis of the lungs is nearly half as much again as the female.

2. The male death-rate from other forms of tuberculosis is higher than the female (as 6 to 5).

3. The death-rate among children under 5 from "other forms" is nearly twice the female death-rate from all forms of tuberculosis.

Before attempting to make any general deductions from the tables I would like to make particular reference to the death-rates in the two towns with which I have been officially connected as medical officer of health, namely, Sunderland and Sheffield.

If the excess death-rate known to be caused among the Sheffield males by the special trades of Sheffield is deducted, it will be seen that there is a factor operating in Sunderland to produce tuberculosis which does not operate in Sheffield. The probability is that this is the effect of climate, subsoil, and situation. Sunderland is mostly built on stiff boulder clay of considerable thickness. The town is comparatively flat, and the climate on the north-east coast is generally considered to be trying as regards respiratory complaints. This is borne out by the fact that pneumonia and bronchitis are always excessive in Sunderland. Sheffield, on the other hand, is extremely hilly; the soil is not of such a clayey nature, and is better drained owing to the hills; the climate is not so trying, and although there is a slight excess of bronchitis and pneumonia, it is found that this is practically among the groups of males over the age of 35, and is probably due to industrial conditions rather than to climatic conditions. The climate is supposed to be bracing, and the many hills enable the air to circulate well round the houses, an advantage which is not found in the case of Sunderland. The frequent climbing of hills is probably good for the lungs of the Sheffielder!

In Sunderland the effect of the clay subsoil is probably exaggerated by the fact that so many of the houses are one story, and the bedrooms are therefore right down on the clay. Until recently there has been no provision for covering the site with concrete.

Sheffield, on the other hand, has a large proportion of back-to-back houses, probably about one-sixth of the whole. Recently I have had some particulars taken out with regard to the Sheffield houses in which notified cases of consumption began. The particulars are as follows, and have reference to all the cases of consumption notified during 1906 and 1907 for which the information was available:

Of 702 males the disease began in a back-to-back house in					233
,, 350 females	,,	,,	,,	,,	111
,, 108 grinders	,,	,,	,,	,,	33
,, 30 cutlers	,,	,,	,,	,,	14
,, 40 smiths, etc.	,,	,,	,,	,,	18
,, 10 filecutters	,,	,,	,,	,,	5
,, 25 silverworkers	,,	,,	,,	,,	8
,, 8 painters, plumbers, etc.	,,	,,	,,	,,	3
,, 215 women engaged in household duties				,,	54

As already mentioned, one-sixth of the houses in Sheffield are back-to-back houses. It is not surprising, however, that one-third of the cases of consumption, instead of one-sixth, should begin in the back-to-back houses, seeing that the back-to-back houses are the cheapest houses in the city, and are occupied, as a rule, by the poorest class of the community.

Sunderland and Sheffield resemble one another in both giving high death-rates for other forms of tuberculosis among children under 5 years of age. Each of them is worse than London. Sheffield has a good climate, as judged by the small amount of consumption in women. The high death-rate among the children would seem to point to bad home conditions, in which, perhaps, the back-to-back houses bear their part. It is quite likely that bad home conditions are more potent in affecting the children than in affecting the women. The women, many of whom may have survived bad home conditions in their infancy and childhood, are probably, on the average, more resistant to home infection than the children. In both towns there is probably a considerable amount of overcrowding, intensified during times of trade depression. The census returns give the following percentages of overcrowding in the two towns at the two last census periods:

	1891.	1901.
Sunderland	32.85 ...	30.10
Sheffield	11.58 ...	9.50

The definition of overcrowding used in this instance is any excess of two persons to a room.

In Sheffield the death-rate among males is more than double the female death-rate. In my annual reports I have shown that this is due to the special trades—chiefly in connexion with the grinders. In Sunderland there is much less difference between males and females, and this is a feature common to most of the ports in the kingdom. The industries of Sunderland are largely in connexion with shipbuilding and coal exporting, and a considerable number of colliers live in the town. It is notorious that colliers are not specially prone to consumption, the coal dust being considered more or less antagonistic to the tubercle bacillus. Many of the occupations in the shipbuilding and engineering yards are practically outdoor occupations, and do not produce any special liability to consumption.

There is no great difference between the death-rate from other forms of tuberculosis in children in the two places, but while in Sheffield three children die to one female at all ages, in Sunderland less than two children die to one female. It is obvious that, as regards consumption, while Sheffield and Sunderland are equally bad places for children, Sheffield is much better for women. I imagine this to be due to the fact that there is in neither case any occupation which is specially liable to cause consumption in women; that the climate and subsoil and physical features of the town are the reasons why Sheffield is superior to Sunderland for women; and that, as mentioned before, the home conditions, which are probably equally bad in both towns, affect the children more than the grown-up women. I have no evidence as to whether there

is any particular difference as regards the prevalence of tuberculosis among the cattle supplying the two towns.

It will be noticed that in the case of many of the towns the figures have not been obtained for the whole of the ten years, and I have thought it advisable, for the sake of giving a fairer comparison, to have new tables constructed for the five years, 1903 to 1907, in which the male and female death-rates from tuberculosis of the lung and from other forms of tuberculosis have been added together. The new tables show that, as a rule, there has been a considerable improvement in the second half of the decade.

Tuberculosis in England and Wales and the Large Towns with over 100,000 Population, also in Four Largest Scottish Towns. Average Mortality-rates per Annum per Million Persons living during Five Years 1903 to 1907.*

Towns.	All Forms of Tuberculosis.		All Forms of Tuberculosis except Phthisis.
	Males (All Ages).	Females (All Ages).	Children (Under 5).
England and Wales	1,936	1,444	2,566
Birkenhead	1,879	1,359	1,373
†Birmingham	2,312	1,280	2,354
Blackburn...	1,963	1,325	3,539
Bolton	2,004	1,321	2,704
Bradford	2,069	1,379	2,222
Brighton	2,632	1,480	3,468
Burnley	2,142	1,504	2,989
Cardiff	1,938	1,592	2,427
Croydon	1,863	1,256	2,418
East Ham...	1,482	1,235	2,163
Gateshead...	2,128	1,647	2,613
Hull	1,730	1,377	1,726
Leeds	2,344	1,605	3,904
Leicester	2,104	1,424	2,662
‡Leyton	1,639	1,112	2,191
Liverpool	2,566	1,746	3,028
London	2,514	1,555	3,141
Manchester	2,996	1,864	3,669
Norwich	2,412	1,646	4,136
Nottingham	2,110	1,383	2,878
Oldham	2,512	1,545	2,842
Plymouth	2,006	1,659	2,600
Portsmouth	2,069	1,538	2,235
Salford	3,027	1,883	4,181
Sheffield	2,245	1,199	3,167
Southampton	2,045	1,305	2,805
South Shields	2,354	1,972	3,021
Stockport	2,296	1,734	4,140
Sunderland	2,421	2,024	3,597
West Ham...	2,135	1,518	2,971
Willesden	1,562	1,138	1,851
§Wolverhampton	1,707	1,079	2,406
Aberdeen	2,137	1,803	3,124
Dundee	2,781	2,613	4,568
Edinburgh	2,181	1,674	3,931
Glasgow	2,667	2,327	4,203

* Nine of these towns were unable to supply the statistics asked for.
† The figures for Birmingham are for four years only (1904 to 1907).
‡ The figures for Leyton are for the five years 1902-4 and 1906-7.
§ The figures for Wolverhampton are for the five years 1902 to 1906.

Tuberculosis in the Administrative County of London and certain of the Metropolitan Boroughs. Average Mortality-rates per Annum per Million Persons living during Five Years 1903 to 1907.*

Boroughs.	All Forms of Tuberculosis.		All Forms of Tuberculosis except Phthisis.
	Males (All Ages).	Females (All Ages).	Children (Under 5).
Administrative County of London	2,514	1,555	3,141
Battersea	2,102	1,443	2,297
†Bermondsey	3,206	2,092	4,561
Chelsea	2,651	1,498	2,818
Hampstead	1,317	863	2,072
Islington	2,170	1,458	2,906
Kensington	2,285	1,214	3,654
Lewisham	1,524	966	2,071
Paddington	1,887	1,075	2,569
Shoreditch	3,586	2,445	5,258
Southwark	3,492	2,320	3,996
Stoke Newington	2,217	1,258	2,881
Wandsworth	1,551	1,008	2,134
Woolwich	2,090	1,540	2,058

* Thirteen only of the metropolitan boroughs were able to supply the statistics asked for.
† The figures for Bermondsey are for four years only, 1904-7.

It will be noticed that there is a very wide difference between the rates in the various towns. Thus, the following are the six worst and six best towns for males:

Worst.

Salford, with a rate of 3,027 per million living.
Manchester, ,, 2,996 ,,
Dundee, ,, 2,781 ,,
Glasgow, ,, 2,667 ,,
Brighton, ,, 2,632 ,,
Liverpool, ,, 2,566 ,,

Best.

East Ham, with a rate of 1,482 per million living.
Willesden, ,, 1,562 ,,
Leyton, ,, 1,639 ,,
Wolverhampton ,, 1,707 ,,
Hull, ,, 1,730 ,,
Croydon, ,, 1,863 ,,

The following are the six worst and six best for females:

Worst.

Dundee, with a rate of 2,613 per million living.
Glasgow, ,, 2,327 ,,
Sunderland, ,, 2,024 ,,
South Shields, ,, 1,972 ,,
Salford, ,, 1,883 ,,
Manchester, ,, 1,864 ,,

Best.

Wolverhampton, with a rate of 1,079 per million living.
Leyton, with a rate of 1,112 ,,
Willesden, ,, 1,138 ,,
Sheffield, ,, 1,199 ,,
East Ham, ,, 1,235 ,,
Croydon, ,, 1,256 ,,

The following are the six worst and six best for children under 5 years of age:

Worst.

Dundee, with a rate of 4,568 per million living.
Glasgow, ,, 4,203 ,,
Salford, ,, 4,181 ,,
Stockport, ,, 4,140 ,,
Norwich, ,, 4,136 ,,
Edinburgh, ,, 3,931 ,,

Best.

Birkenhead, with a rate of		1,373 per million living.
Hull, with a rate of	1,726	,,
Willesden, ,,	1,851	,,
East Ham, ,,	2,163	,,
Leyton, ,,	2,191	,,
Bradford, ,,	2,222	,,

It would be idle for any one not intimately acquainted with the various towns to speculate at length as to the causes of the great variations shown in the death-rates, but one is perhaps justified in drawing attention to some of the salient features of the tables.

It will be noticed that in the case of seaport towns the difference between the male and female rate is usually much less pronounced than in the inland towns, probably owing to the greater proportion of outdoor occupations for men. Among the most extraordinary figures in the tables are the low rates for women in Wolverhampton and Sheffield, and the low rates for children in Birkenhead and Hull.

Salford and Glasgow are among the worst six towns for males, females, and children; and Manchester for males and females. Dundee is among the worst six for all three rates, and is peculiar in having a male and female rate nearly equal; I suppose this is due to the large number of women employed in the jute trade. Dundee is also the worst for children; I understand that about one-quarter of the women employed in the jute trade are married. Possibly the neglected homes and the greater proportion of infants bottle-fed and exposed to the risk of bovine tuberculosis, resulting from the employment of so many married women, are the causes of so heavy a mortality among the children.

Edinburgh and Glasgow are both among the six worst towns for children. Is this due to the difficulty in children getting an adequate amount of fresh air under the flat system? It is difficult to understand how children under 5 years living in flats several stories from the ground can possibly get a proper amount of outdoor life. Norwich comes among the six worst towns for children, and its bad position is no doubt partly due to the practice of the medical officer of health in assigning deaths from marasmus in children over 4 months of age to tuberculous disease. Norwich, however, occupies a bad position, both for males and females. It is a little better than London for males and worse than London for females.

The table is full of conundrums! Leeds is appreciably worse than Bradford, both for males and females, but the proportion between these death-rates in each place is similar. When we turn to the children's rate, however, we find that the Leeds rate is nearly double the Bradford rate!

The three worst London boroughs are:

Males.

Shoreditch, with a rate of	3,586	per million	living.
Southwark ,, ,,	3,492	,,	,,
Bermondsey ,, ,,	3,206	,,	,,

Females.

Shoreditch, with a rate of	2,445	per million	living.
Southwark ,, ,,	2,320	,,	,,
Bermondsey ,, ,,	2,092	,,	,,

Children Under 5 Years of Age.

Shoreditch, with a rate of	5,258	per million	living.
Bermondsey ,, ,,	4,561	,,	,,
Southwark ,, ,,	3,996	,,	,,

One of the most noticeable figures in the London table is the high death-rate among the children in Kensington compared with the low death-rate among women.

The children's rates are probably less reliable than the male and female, owing to errors of diagnosis, so that even if it were possible to obtain information as to the relative prevalence of bovine tuberculosis in different parts of the country, it might still be difficult to trace the effect on the death-rate.

Unfortunately in Guernsey, where bovine tuberculosis has been almost absent, statistics have been also absent, and there was no proper certification of death until the year 1907. In 1907 and 1908 the deaths from tuberculosis among children under 5 years of age in Guernsey were 13 in number, while the total deaths from tuberculosis during the same period were 106—that is, a proportion of about 1 to 8. The proportion of deaths from tuberculosis under 5 years of age in London and in England from 1900 to 1907 to the total is almost exactly one-fifth. The Guernsey figures are, however, much too small to make any deductions from.

In the June issue of *Public Health* there is a paper on infant mortality by the Medical Officer of Health for Malta. The Maltese statistics are extremely interesting owing to the fact that goats' milk is the only milk sold on the island, and that tuberculosis is comparatively rare among goats. The Medical Officer of Health, however, reports that the statistics are probably unreliable owing to the want of proper designation of disease, and to doubtful diagnoses. The following figures are taken from one of the tables in this paper:

Proportion of Deaths to 1,000 Births.

	1901.	1902-3	1903-4	1904-5	1905-6	1906-7	1907-8
Tuberculous meningitis, tuberculous peritonitis, other tuberculous diseases	10.78	4.94	3.63	4.28	2.87	3.19	2.28

Dr. Critien suggests that the sudden drop in the figures for 1902–3 is partly accounted for by the separation of "leucocythaemia" from "tubercle." If the figures for 1901 be eliminated, we obtain an average infantile death-rate from tuberculous diseases in Malta of 3.53 for the six years 1902–7 compared with 5.03 for England and Wales.

The chief point in the second part of this paper is that *we do not know the nature of the local problem until we have analysed the tuberculosis death-rate.* I have always been of the opinion that the prevalence of tuberculosis in a town or district is one of the guides to its sanitary condition. I cannot help thinking that it would be a good plan for the Local Government Board to require in the tables drawn up by the Board for use by medical officers of health in connexion with their annual reports an analysis of the tuberculosis death-rate similar to that given in this paper. This would be a means of giving to the subject the importance which it deserves. As a natural sequel, if a town or district showed a consistently high death-rate from tuberculosis among males, females, or children, a Local Government Board inquiry would take place, just as it does now in the case of an excessive prevalence of typhoid fever.

In the *Lancet* for June 19th reference is made to a paper by the Medical Officer of Health for Calcutta on Tuberculosis. It is shown that the death-rate for males is 2 per 1,000 and the death-rate for females 3.5 per 1,000, and, further, that the death-rates among Mohammedan and Hindu females are 5.8 and 3.0 respectively. The high rate among the women is attributed largely to deficiency of fresh air, and the need for improvement is pointed out. A comparison is made with the population of England and Wales, but a glance at the tables in this paper shows that the Hindu female population of Calcutta is not much worse than the female populations of Dundee and Glasgow.

A second suggestion which I have to make is that means should be taken to get a more accurate census of the workers in the various trades, in order that the excessive prevalence of tuberculosis among any group of workers may be more readily detected. Whether this could better be done by means of more explicit instructions to the census enumerators or by having the Home Office triennial return of workers made according to sanitary districts, I do not know. In Sheffield the enumeration of the workers is peculiarly difficult owing to the number of tenement factories; but in most places, if the triennial return were made according to the sanitary districts, the Home Office would be able to supply the number of workers and the sanitary authority the number of deaths among the workers, a correction being made where necessary when an appreciable number of the workers lived in one sanitary district and worked in another.

DISCUSSION.

Dr. McWALTER (Dublin) said that he was a strong opponent of compulsory notification. Dr. Scurfield's paper showed that whereas formerly 11 persons out of every 1,000 died of consumption in the workhouse, now 38 persons out of the same number died there—apparently as a result of compulsory notification of tuberculosis. This was not desirable. It might possibly be necessary to notify in a city like Sheffield, where such a large proportion of the population worked at grinding and the cutlery trades, where hundreds of men worked within a few inches of each other, but he considered that it was quite undesirable in cities like Dublin or Belfast, or in the country at large. To register a man as a consumptive branded him as a leper and hurried him into the grave. There were superstitions in science as well as in religion, and the cult of terror for the tubercle bacillus was a twentieth century superstition. The matter was one of great interest in Ireland at the present day, because a Tuberculosis Prevention Act had been passed for Ireland; but the compulsory notification clause was voluntary, and might be adopted or rejected by the local authority. For the purpose of carrying out the Act an Order in Council had been made, and this Order in Council was the most imbecile order the mind of man could conceive. It laid down, not that every case of tuberculosis should be notified, but it applied only to the poor and not to the rich—that is to say, the doctor was to notify only if the person habitually slept in the same room with others not affected. Obviously, it was impossible to ascertain whether the other occupants of the room were affected or not, especially in Dublin, where 30,000 out of 50,000 families lived in single-room dwellings. In the very interesting volume on consumption, published by the Women's National Health Association, it was stated on the authority of the President of the College of Physicians that it had been found that at least 50 per cent. of old men showed signs of tuberculosis. If these cases had been notified, and they had become aware of their disease, probably they would never have reached old age; the fear of the disease and the mark of the leper would have hurried them into the grave far sooner. In every other disease in which there was compulsory notification, the local authority provided hospital accommodation for the patient; but there were 100,000 cases of tuberculosis in Ireland, and hospital accommodation for them would cost £2,000,000 a year. It would be impossible to afford this, and it was an offence against the liberty of the subject to adopt the methods of the Holy Inquisition in the twentieth century, when the effect of notification would be to deprive the worker of his work, and not give him a home.

Sir CHARLES CAMERON (Dublin) regretted that he was not in accordance with Dr. McWalter on this occasion, although he recognized that no one was more interested in the welfare of the dependent classes, or had done more to promote it. If some inconvenience was caused by notification, it was nothing to the good achieved thereby. In Dublin the deaths from tuberculosis exceeded by three times those from any other disease. Something had to be done with regard to that dread disease, and it appeared to him that the provisions for notification were fair and reasonable in the Act. It had, however, one blemish which he regretted, namely, that notification was optional. There were two kinds of Sanitary Acts—the "may" and the "shall." He disliked the former, as they were not generally acted on. If it was desirable that certain things should be done to improve the public health, then the word "shall" and not "may" should always be used. He dissented from the belief that compulsory notification of tuberculosis would be resented. There had been voluntary notification for some years in Dublin, and in hundreds of instances action had been taken similar to what was provided under the new Act, and yet no one had complained, whilst all were grateful. Literature, spittoons, and disinfectants had all been thankfully received. Now in Ireland all laws which the people believed just were obeyed. He addressed his remarks to the English present. In their country the vaccination laws were not always respected—in Leicester, for example—whilst in Ireland no one, except by mere negligence, failed to get his child vaccinated. He was glad to say that the Corporation of Dublin had accepted the recommendation of their Public Health Committee to adopt the Act. He would like to know what those who opposed notification proposed, for up to the present he had heard nothing practical from them.

Sir JOHN BYERS (Belfast) said that in Ireland they had a condition of affairs that hardly existed in any other country, and the first question they had to face was, "Where was the disease?" They could only get at that by compulsory notification, and then they might proceed a little further. Good work had been done in Belfast by Dr. Bailie under a voluntary notification system, but it only reached a very small proportion of tuberculous patients. The reason the Irish Act was not as strong as he would like was owing to the opposition to it when it was before the Parliamentary Committee; but it was a beginning, and he hoped that in Belfast and other places they would adopt the Act and find out how it worked, and thus help to rid their country of a preventable disease.

Dr. NASMYTH (Edinburgh) said that as a medical officer of health for thirty years he was a warm supporter of compulsory notification. There was a great deal of intentional misapprehension about the meaning of notification. This misapprehension was sometimes meant to prevent the working of a perfectly easy thing. For twenty years they had had compulsory notification of certain infectious diseases, and in those cases compulsion did not cause any friction. He was perfectly astonished by the difficulties which were put in the way of the compulsory notification of this most destructive, deadly, and worst of diseases. Phthisis occurred in every country, and in every age, sex, and occupation; and to say that notification should apply only to certain places was a manifestly illogical contention. Voluntary notification was only a way of introducing compulsory notification, without which we could not hope to completely eliminate phthisis. International congresses had again and again advocated it. What would the antagonists to notification suggest in the case of outbreaks of small-pox or typhus? What would they do without notification? At the same time, notification was not everything, and they must not neglect the well-known methods of hygiene, and especially such pioneer work as had been carried out by the open-air treatment and dispensary treatment of phthisis in Edinburgh.

Dr. A. GILCHRIST (Nice) said that Sir Charles Cameron had asked what alternative there was to compulsory notification of tuberculosis. He should say—imperial climatic colonization. Races and communities had the diseases they deserved, according as they elected to evolve. Was their ideal Darwinian or Lamarckian? Would they accept their environment, and allow selection to choose the fittest, or would they modify their environment, and create the race that adapted itself to the form? Or, in Nietzschian language, would they be slaves or supermen? He thought Englishmen, using the word in its broad sense, should be supermen. He had more or less utopian conceptions as to how this ideal should be realized. They were not altogether those which had been discussed that day. In view of the recent description by Professor Poncet, of Lyons, of an important variety of tuberculosis which he had designated as inflammatory, a form so similar to rheumatism that the condition could be called tuberculous rheumatism, the difficulties of notification became theoretically insuperable. Compulsory notification should be limited to the open germ-producing forms. The French advocated the preventorium, the Germans popular sanatoriums and compulsory insurance. What should be the English method? Englishmen should obey the instincts of their race, which were migratory. They should change their environment, and spread into every colony, as their ancestors spread into every clime. Instead of notification he would suggest the colonization of all forms of pre-tuberculosis.

Dr. RENTOUL (Lisburn) said that it was the general practitioner who knew most of tuberculous manifestations. The district he came from had a very large proportion of tuberculous patients. Medicine *per se* had done little for the consumptive, and it was not until State aid was given in the shape of compulsory notification that the death-rate would be reduced. Instead of spending State money on sanatoriums he would endeavour to turn the people's houses into sanatoriums by improving their sanitary condition. He believed that the majority of Irish practitioners would approve of compulsory notification.

Dr. Herbert Jones (Hereford) referred to the fact that the Irish Act required only infective cases of consumption to be notified, so that Dr. Gilchrist, in approving of the notification of "open" cases, really expressed approval of the Act. He emphasized the importance of some provision being made for the families of consumptive men who were being treated in sanatoriums.

SCHOOL MEDICAL INSPECTION.

By Edward Magennis, M.D., D.P.H.,
Dublin.

By the seventy-fourth report of the Commissioners of National Education in Ireland, it appears that the total number of pupils on the rolls of the ordinary national schools was 675,471; in model schools, 9,186; and in convent and monastic schools, 112,833, making up a total of 797,490—about 60,000 less than there were six or seven years ago. For these there were provided 8,538 schools. Public interest has of recent years become somewhat aroused with regard to the sanitary condition of these schools and the hygienic surroundings of about 800,000 children. The importance of this question and the consequent duties it entails cannot be gainsaid, for it concerns intimately the health and development of our youth—and that the youngest portion—who spend six hours or upwards daily in the schoolroom.

It is my purpose in the present paper briefly to review some of the conditions which prevail therein, and to point out the necessity for systematic medical inspection of Irish schools and scholars. If you allow me, I shall occupy your time for just a few minutes by reading to you some extracts from the most recent reports of the inspectors of these schools, and I think they will prove to you, if proof indeed were necessary, that some of the national schools in Ireland are in a deplorable condition and quite unsuitable to be used as such.

On page 15 Mr. McGlade says: "The heating of the rooms is very far from satisfactory." Mr. Bradshaw says:

> The supply of fuel is frequently inadequate, and although there is generally a nominal fire, the schoolroom is often cold.

On page 37 Mr. Stokes reports:

> Forty-seven schools have no playgrounds, and sixteen of the others have bad ones. The heating arrangements are not satisfactory in more than a quarter of the schools. The children bring some turf, but most of the expense of providing it falls upon the teacher.

On page 38 Mr. Horan reports:

> The sanitary condition of the schools is not satisfactory. Even in vested schools the closets are not cleaned with sufficient frequency and are scarcely ever deodorized. In non-vested schools matters are much worse. In many of them there are no closets, and it is difficult to see that the children can grow up with any regard to delicacy and the observances of the decencies of life.

On page 55 Mr. Beatty reports:

> Again, as to the eyesight, I have little doubt that in a good many cases permanent injury is done to children's eyesight by working in the gloom of many of the schoolrooms. Till medical inspection of school children is introduced there can be no certainty on such points, but there can be no doubt that some startling facts will then be disclosed, as have been disclosed in every other country where such inspection has been introduced.
>
> The following figures may, however, be given as the result of casual inquiries. In three schools, with a total of 169 on rolls, I find there were 3 children using spectacles, 1 suffering from cataract, 1 with watery or suppurating eyes, 1 under medical treatment, 3 suffering from pains in the eyes, 3 with weak sight, 3 short-sighted, 5 very short-sighted, or a total of 20 with defective sight.
>
> I may add that these were all obvious cases, which had attracted the attention of the teachers.

On page 102 Mr. Connolly reports:

> Several schools are unprovided with out-offices, and where out-offices do exist, I regret to say there is much neglect. In some instances the neglect was so great that the out-offices became a menace to public health. In one case legal proceedings had to be instituted to abate the nuisance. I have little doubt that such neglect is a source of the many epidemics that occur so frequently in this circuit. Within the past two years schools have been closed in one locality or another from outbreaks of scarlatina, typhoid fever, measles, diphtheria, etc.

On page 103 Mr. Lavelle says:

> There are sixteen very unsuitable houses. These structures are placed in low-lying and badly-drained situations. Some of them have mud walls, and they are usually thatched and unceiled. The floor is either earth, or boards laid on the earth. During the past winter I have frequently seen the children in such physical discomfort from cold that it was unreasonable to expect them to work effectively.

On page 118 Mr. T. P. O'Connor says:

> In the "Teacher's Return," which the manager signs, there is the query, "How is the cost of heating defrayed?" The usual answer is, By the teacher and the children; or, The children contribute a little and the teacher the rest. Rarely do we find the answer, By the manager. Yet it ought to be the universal answer, for surely the heating, as well as the repairs, equipment, and renewals, ought to be a charge upon the management.

On page 149 Mr. Morgan says:

> The majority of the schools are old and defective from an educational standpoint. At least a dozen are situated in graveyards. Many of them are without playgrounds.

These are extracts from the reports of the inspectors men whose duty it is to investigate such matters. How can any one, in the face of these, maintain that these schoolhouses in Ireland are fit places in which tender youths are to be housed up five or six hours of the day?

What is the condition of the vast majority of these children on entering the schoolroom any morning? Many of them are obliged to walk, perhaps two or three miles, it may be through rain, sleet, or snow, and when they arrive their clothes may be soaked with water. They enter a bleak, cold room, in which there may not be a fire, or, if there be, it is most inadequate, and here they are compelled to remain for hours, shivering with cold and altogether in a most pitiable condition.

There is no provision made by which the outer garments, at least, may be dried during their stay. The schools are, as a rule, placed on unhealthy sites, their general construction is bad, and the sanitary or insanitary state of the out-offices seems to be undreamt of by anybody except the inspectors. The lighting, ventilating, and heating are nearly always defective, and the seats are constructed without regard to age or size.

Sir W. Whitla, speaking recently at the opening of new national schools, said that he did not know at the present hour of a more serious question than the condition of the national schools in Ireland. With, he feared, but few exceptions, these were in a deplorably unsatisfactory state from a sanitary point of view. The most serious defect was the scandalous deficiency of the ventilation, whereby he was morally certain many lives were sacrificed and many children were permanently crippled or rendered unfit to take a proper place in their future life struggle through the physical delicacy permanently inflicted upon them by being compelled to respire the rebreathed and foul air of the crowded schoolroom. The languishing wail of the pining school child doomed to breathe daily such a tainted atmosphere as prevailed in too many of the classrooms rose to heaven, though they failed to hear it, drowned as it was by the din of party strife and the clamour of political agitation, the shrieks of the suffragettes, the hysterics of the antivivisectionist, and other well-meaning but misguided people. Every function of the child was depressed, and every organ starved and stunted in its development by the polluted air, so that their death-rate in Ireland from tuberculosis had become a standing disgrace.

If the parents realized the insanitary condition of these schoolrooms, and the grave risks their children incurred, they would speedily take an active interest in school matters, public opinion would be centred on this vital question, and a complete and radical reform would be effected.

The inspection of all such matters should be in the hands of a medical sanitary expert, and, in addition, he should also inspect the children themselves. On the Board of National Education in Ireland, consisting of twenty members, there is not a single medical man. On the Intermediate Board of Education in Ireland, consisting of fourteen or fifteen members, there is not a single medical man. These are the two principal educational boards in Ireland, and yet the powers that be effectually exclude the medical profession from representation on them.

The following are some of the points on which a medical inspector should advise:

1. School—Site, construction, ventilation, lighting, and heating.

2. Scholars—Overcrowding, posture, games, and play. Cleanliness, signs of fatigue, neglect, mental deficiency, defective vision, defective hearing, defective teeth, and communicable diseases.

Attached to each of the boards of education there should be a sanitary department, with medical officers to examine and certify every school. The science of hygiene, especially that part of it that pertains to school life, should be taught, and every teacher should possess a certificate for teaching this subject.

How many clever, brilliant children are brushed aside and neglected because of some physical defect in their sight or their hearing! What disastrous results to the ears might have been averted by the timely removal of adenoids! How many children are handicapped by the numerous ocular defects! How many squinting deformities might be remedied, without operation, simply by the timely use of proper glasses, if these defects had been recognized in early life!

All the preceding points the medical officer would take cognizance of, but the major portion of his duties would be the prevention and detection of the many contagious and infectious diseases, of which our schools are the principal media of dissemination. I have seen children in schools with an unmistakable rash of measles upon them, and I have also seen children with the skin peeling off after an attack of scarlatina, and I know of one school where a child of about eight years took a "fit" of whooping cough, and the teacher asked one of the other children to hold the hands of the little sufferer during the spasm. How is it that we in Ireland pay so little heed to the matters affecting the public health, whether of adults or of children?

During the passage of the Local Government Act of 1898 there were ample opportunities for making appointments in Ireland, as are made in England, of superintendent medical officers of health for each county, but no effort was used in that direction. One of the many reforms which Australia has initiated without waiting for a hint from the Mother Country is the special inspection of school children, with special reference to sight. In his most recent report the doctor who acted on behalf of the South Australian Government reported that he found that only 39 per cent. of the children had absolutely normal eyesight, but amongst the remainder, cases of gravely defective sight were not very common. There were 65 per cent. who suffered from enlarged tonsils, post-nasal growths, or both. About half the children had never been vaccinated, and in general the condition of their teeth was deplorable.

With a declining and enfeebled population can we view with other than extreme anxiety and apprehension the future physical and mental condition of the school children of Ireland? The whole question of school life must be brought prominently before the public and precautions taken that our few remaining youths will be properly provided for when in the schoolroom and their physical development in no way impeded. We should stimulate our people to fall into line with other countries, where the preservation of youthful health is looked at from a national standpoint.

Our legislators seem to value the farm stock more than they do the children. If an outbreak of an infectious or contagious nature occurs amongst our cattle urgent and strict methods are immediately adopted to stamp it out, and all necessary directions for this purpose emanate from a staff under the direction of the Minister of Agriculture. When the State recognizes its serious responsibility in the matter and appreciates the noble efforts of our sanitary reformers, when a Minister of Public Health is appointed, as I suggested at the Folkestone Congress of the Royal Institute of Public Health in 1904, and when our schools are placed under Government medical inspection, then the health and well-being of our children will be properly looked after, and the State will be compensated by a lessening of the mortality from infectious diseases propagated in the schoolroom, and by a radical improvement in the general health and physique of the people.

Reports
ON
MEDICAL AND SURGICAL PRACTICE IN THE HOSPITALS AND ASYLUMS OF THE BRITISH EMPIRE.

NELSON HOSPITAL, NEW ZEALAND.

AN UNUSUAL CASE OF TETANUS.

(Reported by W. J. MACKAY, M.D., Surgeon to the Hospital.)

THE following case of tetanus presents no extraordinary features, but in a disease which has such an enormous mortality, any case of recovery, throwing however little light upon questions of prognosis or treatment, becomes of interest and importance. For this reason I venture to publish the following details. I may say, in parenthesis, that Babes states the mortality to be about 77 per cent. in patients with an incubation period of from ten to twenty days. The incubation period in this case was thirteen days.

P. D., aged 10 years, and small for his age, was admitted on Monday, April 26th, 1909.

The history was that thirteen days before the first symptom was observed he had been out paddling with bare feet in a tidal mud flat, and received a small wound in the sole of one foot. (On admission, the wound was healed, but its site was marked by a discoloured cicatrix.) On April 24th he complained of difficulty in opening his mouth, but his people thought it was from "cold." On April 25th the difficulty increased, but even then excited no apprehension, and it was not until more general spasms began to develop on April 26th that a medical man was called in, who immediately sent the boy to hospital.

On admission, he was able to separate his teeth about one-sixteenth of an inch, and risus sardonicus was present. The muscles of the back were becoming rigid, and he suffered from occasional painful spasms. These symptoms increased in severity. Opisthotonos became marked, the abdominal muscles became rigid, the painful spasms more frequent, and trismus became absolute. The temperature was highest on the fourth and fifth days of treatment, but did not exceed 99.8°; it was 99° on admission. The pulse, which was 90 on admission, attained its greatest frequency on the second day, being then 112. He was given one dose of 10 c.cm. of tetanus antitoxin each day for five days. On the sixth day he was given one dose of 30 c.cm., when the temperature fell and did not materially rise again. The antitoxin was that of the Lister Institute, and was given hypodermically. In addition he was given by enema 20 grains each of chloral and potassium bromide in water (℥ iv) every eight hours; its retention was ensured by giving previously tincture of opium, ♏v, in water (℥j). On the third day it became evident that the painful spasms were diminished in severity by the enemata, which I reduced to one a day on account of his pulse. I now gave hypodermically every two hours a drachm of a ½ per cent. solution of carbolic acid. It was given alternately on each side of the spinal column, beginning at the neck. Finding the painful spasms become more marked, I was obliged to increase the frequency of the chloral and bromide enemata, and for the next six days they were given about twice a day, the severity of the spasms determining their administration, and after that only occasionally. The hypodermic injections of carbolic acid were stopped on May 6th; for the previous four days the strength had been increased to 3 per cent., half a gram of which was given every three hours during the day.

On May 4th, the ninth day of treatment, finding the symptoms persist in such a degree of severity as to threaten exhaustion, I gave him hypodermically a final dose of 60 c.cm. antitoxin. There was a slight reaction after this dose, the temperature rising to 99° on two days. The after-progress was steady and rapid, the tonic spasm gradually passed off, and the painful exacerbations ceased. He was able to protrude his tongue in five days, and on May 10th could masticate bread. He was free throughout from any marked involvement of the muscles of respiration

or deglutition, and owing to an irregularity in his teeth it was easy to introduce fluid nourishment by means of a tube. His food consisted of eggs beaten up in milk with a small quantity of brandy. When the spasms were most severe he rested on his occiput and heels, and short of this the spasms were sufficiently severe to make him cry out and induce perspiration.

It may reasonably be asked why I did not begin treatment with the large dose of antitoxin. As a matter of fact I began with greater confidence in other methods and up to a certain point retained this confidence, but ultimately fearing exhaustion, I decided to give the large doses. The result was most satisfactory.

In conclusion, from careful observation of the case, I have no doubt as to the beneficial effects of the chloral and bromide enemata in reducing the frequency and severity of the spasms and securing sleep and rest. It is more difficult to form an opinion as to the effects of the carbolic acid, but it seemed to have at least the effect of easing the muscles subjacent to the hypodermic injections; it may also have been the result of the carbolic acid that the tonic spasm relaxed first in the cervical and dorsal regions where most of the hypodermics had been given.

I would further note the very rapid improvement after the large doses of antitoxin, and the complete absence of any evil effects.

Reviews.

SUTURE OF ARTERIES.

MR. ARCHIBALD SMITH'S report of his experimental research on the *Suture of Arteries*[1] sees the light as one of the Oxford Medical Publications. It recounts a very creditable piece of work on a matter of pressing interest, and is presented in a simple and straightforward way very pleasant to read. The first section gives a summary of the early history of the subject, from Lambert's account to Hunter of Hallowell's first successful suture, up to Jensen's paper in 1903. The list of operations on the human subject quoted from the last-named author is not quite complete, as may be judged by the article published last year in the *Beitrage zur klinischen Chirurgie*, by Faykiss, but that is a minor matter.

In the second section he describes the various methods that have been employed for end-to-end union; Gluck's "cuff" method, Murphy's invagination device, the protheses of Payr, made in metallic magnesium in two forms —a grooved cylinder and a double-flanged cylinder, one face of which is provided with spikes and the opposed face with holes to receive them—together with the U-suture of Brieau and Jaboulay which affords the simplest means of approximating intima to intima. In the third chapter there is a discussion of the sources of failure, followed by an account of the technique devised by the author and tested in the animal experiments that formed the basis of this research.

The chief dangers connected with artery suture are, he says, haemorrhage, sepsis, thrombosis, and aneurysm. All experimenters are agreed that aneurysm is a rare sequela of suture; haemorrhage need not be feared, it appears, if fine round needles be used together with suture material that completely fills the needle holes, and is not too tightly tied. Thrombosis, the commonest cause of failure, is almost always due to sepsis, and the most rigid precautions possible are essential to success, but it seems to be desirable to exclude suture material from contact with the blood stream, whilst perforating all the coats. Putting on one side mechanical appliances of all descriptions, for obvious practical reasons, the author adopted the U-suture as the ground-plan of his technique, but modified it by laying a quill suture of chromicized catgut through all the loops on the distal side and tying all the knots over another thread on the proximal side, taking care to cross the two limbs of the suture in their passage through the tissues. He has invented a neat holder for the fixation sutures employed at opposite points of the circumference in end-to-end suture, but this would be unnecessary in actual operating with skilled assistance. The experiments were all performed upon dogs, and the results were satisfactory and instructive.

In section four, on the histological results, very interesting observations are recorded, tending to show that *restitutio ad integrum* may be attained. Not only muscular fibres, but even new elastic fibres could be traced in the site of the cicatrix, the intima having been re established very early in the course of healing. The author thinks that thrombosis of microscopical dimensions is unavoidable as a temporary phase of the healing process, and that it is probably actually favourable to repair. There is at present no evidence of the efficacy of the method as applied to man, but the ground is thoroughly prepared for trial when suitable opportunity offers, and the surgeon who wishes to be ready for the event—often an emergency —cannot do better than study this little volume, in which he will find excellent diagrams and many suggestions as to details of technique. There are some good figures of photomicrographs of the histological appearances. The research was carried out under the direction of Professor Hochenegg.

[1] Oxford Medical Publications. *Suture of Arteries: An Experimental Research.* By E. Archibald Smith, M.B., Ch.B., F.R.C.S. London: Henry Frowde, and Hodder and Stoughton. 1909. (8vo, pp. 68, 14 illustrations.)

IMMUNITY AND SPECIFIC THERAPEUTICS.

THE second and concluding portion of volume ii of the work on the technique and method of immunity investigation,[2] edited by Professor KRAUS and Dr. LEVADITI, contains several articles on subjects which are of general interest. In Dr. Levaditi's chapter on phagocytosis we have no fault to find with the technical portions, but we consider that his introductory pages on the classification of the phagocytes are not particularly helpful. They are little more than a repetition of Metchnikoff's well-known theory, and fail to elucidate obscure and difficult points, such as the precise nature and origin of the various cells ambiguously described as "macrophages." In a work such as this, which aims at treating its subject exhaustively, regardless of the amount of space required, we are surprised to find that opsonins are dismissed in the short space of twenty-three pages, which cannot be regarded as presenting the German reader with an adequate review of the extensive and important contributions which have been made to this subject by many English pathologists. After a lengthy and important article by Dr. Böhme on bacteriolytic serums there follows a series of chapters on the preparation of various specific antitoxic serums. Agglutination and clinical serum-diagnosis by means of the agglutination test are dealt with by Drs. Volk and Kreissl. The application of the precipitin method for the biological differentiation of albumens and the employment of this procedure for the purposes of forensic medicine are described by Drs. Uhlenhuth and Weidanz, and occupy over a hundred pages. Here we think the authors enter more fully than is needful into quite elementary details of technique, such as how to weigh a rabbit, how to make an intravenous and an intraperitoneal inoculation, and the like. We may remark, with reference not only to this but to many other articles in these volumes on immunity, that the editors would have saved much space and many needless repetitions if they had concentrated into one chapter an account of the ordinary routine technique of the experimental laboratory and instructed the writers on special subjects to restrict themselves to details of manipulation not included therein. Amongst other interesting matters discussed in the present volume are anaphylaxis, the Bordet-Gengou reaction, and the serum diagnosis of syphilis.

Owing to the rapid accumulation, both in bulk and in complexity, of the literature on immunity, it is increasingly difficult to keep pace with it, and it is therefore desirable to have a general survey of the subject as it now stands condensed into the space of a reasonably small volume. Dr. EMERY'S *Immunity and Specific Therapy*[3] represents an endeavour to fulfil this need. In addition to giving us the general outlook, it is critical without being too controversial; and though the subject is necessarily technical and intricate, it is treated with sufficient simplicity to

[2] *Handbuch der Technik und Methodik der Immunitätsforschung.* Herausgegeben von Professor Dr. R. Kraus und Dr. C. Levaditi. Zweiter Band. Zweite Lieferung. Jena: Gustav Fischer. 1909. (Sup. roy. 8vo, pp. 279-1219. With illustrations. M. 25.)

[3] *Immunity and Specific Therapy.* By W. D'Este Emery, M.D., B.Sc. London: H. K. Lewis. 1909. (Demy 8vo, pp. 448, with illustrations.)

render it comprehensible to the beginner, who will be particularly glad to find that there is a glossary at the beginning of the volume in which the meanings of the more important technical terms are explained. In the earlier chapters, which enter into the more difficult theoretical problems of the relations of toxin to antitoxin, bacteriolysis, and the formation of precipitins and agglutinins, Dr. Emery is conspicuous for his impartiality. Only too often we find that writers on this subject are, perhaps unconsciously, the victims of bias in favour of some particular view, and are so anxious to detect the weak points in their opponent's case that they are unable to appreciate its merits. Dr. Emery gives fair play to both sides, and this is undoubtedly the right method of treatment; though it gives an air of inconclusiveness to some of his chapters, that is not his fault but is due to the impossibility of arriving at final conclusions from the data at present available. The chapter on phagocytosis commences with an account of the researches which were initiated by Metchnikoff. This leads us to a consideration of the extracellular influences which affect the vitality of bacteria, and is followed by a general discussion of the value of vaccine therapy and the significance of the opsonic index. Speaking from his own experience, Dr. Emery does not find that the results of vaccine treatment are always encouraging. In this method of dealing with tuberculosis he says:

> I can only report a moderate degree of success, and this only in small lesions, such as tubercle of the iris or cornea and of tuberculous ulcers. I have had but one or two encouraging results and numerous failures with tuberculous glands, bone disease, etc., though others have apparently been more successful. In phthisis there appears to be some slight benefit when combined with other treatment, and tuberculous sinuses sometimes heal very quickly. I should only recommend the treatment myself as an adjunct to other methods, or when surgical interference is impossible or inadvisable.

He has found, however, that with infections due to staphylococci, pneumococci, *B. coli*, and some other organisms, the results are most beneficial. Vaccine therapy, when successful, does not, he remarks, necessarily prove the truth of the opsonic theory regarding the control of dosage.

> The more carefully the opsonic index is considered the more certain will it appear that a high index is not an indication of immunity; it neither proves that the lesion is undergoing cure nor that a fresh infection will not occur.

A low index, again, is not any proof of lack of immunity, since, as he has found by personal observation, patients may show decided improvement during a prolonged negative phase. Against the argument put forward by some of the opsonists that in such cases the clinical signs are unreliable, the author makes the pertinent remark that this deduction "is logical only if we regard the raising of the opsonic index, and not the cure of the patient, as the object of treatment." Amongst the chapters in the concluding portion of the volume may be mentioned one on "the colloidal theory of antibodies," which gives a very interesting epitome of recent work on the interpretation of immunity by the light of colloidal chemistry.

In his book on opsonins and the opsonic therapy,[4] Dr. RENÉ GAULTIER sketches for French clinicians the main outline of the theory and practice of Sir Almroth Wright. In France vaccine treatment has not made the progress which it has made in England. To most doctors even its terminology is scarcely familiar, and it has not yet advanced from the region of scientific experiment into the domain of practical therapeutics. This little volume, therefore, in the series of Les Actualités Médicales, should do good service by calling attention to the reality of the benefits which vaccination renders in so many infections. A sketch, necessarily very brief, of some of the more fundamental facts of immunity is given, followed by an account of the nature of opsonins, the method of determining the index, the nature of vaccines, the effect of injections on the index, with illustrative curves; and, finally, by a chapter on the use of vaccines in practice. Written primarily for the clinician, the book does not enter in any detail into theoretical questions and avoids current controversies. To say, however, that "opsonins are, in the phrase of English authors, bacteriotropic substances, substances analogous to alexins, which, interposing themselves between the bacteria and the phagocytes, further the ingestion of the former by the latter," is rather a confusion than a conciliation of opposing views. It seems a pity, since it is the clinician to whom the appeal is addressed, that no information as to the results achieved by the use of vaccines is included. The limited experience of the author, confined to four cases of general gonococcus infection, is no doubt partly responsible for this omission. There are, however, statistics available which might have been quoted to show that the results are really noteworthy and would have greatly strengthened the general argument of the writer. As it is, the reader is left without information on such important points as the frequency of successful inoculation in the various diseases, the permanence or otherwise of the cure, and the practical necessity in some cases of using the patient's own organism in the preparation of the vaccine. Dr. Gaultier, indeed, states that his two chief reasons for recommending the method in general practice are, first, that in a large group of diseases the laborious index determinations can be dispensed with and the correct intervals and sizes of dose inferred accurately enough from clinical signs; and, secondly, that by the use of stock vaccines the necessity of obtaining the patient's own organism can be avoided. Some disappointments, however, might have been saved if it had been more clearly pointed out that stock vaccines are not by any means always effective.

In *Vaccine and Serum Therapy*[5] Dr. SCHORER presents an interesting review of his subject within a very reasonable compass. So much work is being done just now on these lines that the practitioner cannot possibly keep pace with the development of knowledge, and such books as this serve a very useful function by collecting and condensing the bewildering mass of scattered observations. Dr. Schorer, however, does more than merely collect; he criticizes sanely and temperately, and even includes some original work in his limited space. It was perhaps inevitable that the more general aspects of immunity should be treated in as compressed a manner as possible; but so complex a matter cannot be reduced to small bulk without loss of lucidity, and it is at least arguable that the reader would have got a more intelligent grasp of the detail had a fuller treatment of the main principles been given. Dr. Schorer is more generous than most in his introductory matter, and speaks from wide knowledge, which is not always the case. One third of the whole book is occupied by a discussion of opsonins and the opsonic index. The author, while recognizing in full the value of bacterial vaccines in the treatment of many infections, emphasizes the importance of other immunizing bodies than opsonins, and concludes that "the results obtained in determinations of opsonic index in health and disease are so variable that its importance as a means of diagnosis, prognosis, and indication of actual immunity must be doubted." It is unfortunate that this otherwise excellent little book is disfigured by so many misprints.

DISEASES OF CHILDREN.

DR. STILL'S contributions to the knowledge and literature of children's diseases have been so numerous and valuable that a new work by him is sure of a ready welcome and appreciation. We may say, however, that in our opinion the title he has chosen for it, *Common Disorders and Diseases of Childhood*,[6] is scarcely a happy one. The foundation of the work was lectures he had delivered at King's College and the Hospital for Sick Children, along with papers published in the current medical journals and the transactions of various societies. These have been amended and added to, with the result of the present volume. Dr. Still was under the difficulty in the choice of a title for what he terms his "farrago

[4] *Les opsonins et la thérapeutique opsonisante par les vaccines de Wright.* By Dr. René Gaultier. Paris: Baillière et Fils. 1909. (16mo, 78 pp. Series of Les Actualités Médicales. Fr.1.50.)

[5] *Vaccine and Serum Therapy.* By Edwin Henry Schorer, B.S., M.D. Mosby St. Louis. 1909. (8vo, 131pp. 2 dols.)

[6] Oxford Medical Publications. *Common Disorders and Diseases of Childhood.* By George Frederic Still, M.A., M.D.Cantab., F.R.C.P., Professor of Diseases of Children, King's College, London; Physician for Diseases of Children, King's College Hospital; Physician to Outpatients, Hospital for Sick Children. London: H. Frowde, and Hodder and Stoughton. 1909. (Demy 8vo, pp. 743. 15s.)

libelli," in that he was already the joint author, with Dr. Goodhart, of a treatise on children's diseases, with a well-established reputation. He might well, then, deem it superfluous to publish another work on his own account with a title in any wise akin to the one of which he is the joint author. We quite admit the difficulty he was placed in, but nevertheless consider the title a misleading one. It led us to expect a treatise on the minor ailments of children, and we were totally unprepared to find that, with the exception of the specific fevers and skin diseases, *Common Disorders and Diseases of Childhood* deals with every disorder of childhood, both common and rare. The work is indeed an excellent treatise on the usual maladies of children, with some arrangements that are novel. As examples of such arrangements we would instance the chapters on such subjects as "Abdominal Pains in Children Beyond the Age of Infancy," "Bilious Attacks, So-called, in Children," "Fever of Obscure Causation," "Jaundice in Children," and several others. There can be no doubt that such groupings, and the dealing at length with a single prominent symptom, has many advantages in the case of children, and such a plan is likely to be of the utmost service to many practitioners in times of difficulty. All with experience will echo Dr. Still's advice as to the careful examination of the abdomen in cases of "bilious attacks," as recurrent appendicitis is apt to be ascribed by mothers to "biliousness," and so to be lightly regarded. Whilst the chapters on infant feeding are concise but ample, the author perhaps overrates both the disadvantages of barley-water and the advantages of citrate of soda as additions to cow's milk. Dr. Still is one who believes that pyloric stenosis in infants is much more frequent than is usually supposed, and has met with no fewer than 42 cases in his own practice. Coming from one of his large experience, his remarks on treatment are deserving of the closest attention. He is of opinion that a considerable proportion of such cases can be cured without operation, but is equally of opinion that in some operation is the only resource which will save life. Debatable questions Dr. Still discusses at length and impartially, but in most cases does wisely to leave his readers in no doubt as to his own views upon them. On the vexed question of the etiology of chorea, for instance, he writes: "For my own part, I may say at once that I regard chorea as just as good evidence of rheumatism as a gumma is of syphilis, but I am not blind to the arguments which may be advanced against this view." Of recent years, again, the theory that an infant can only inherit syphilis from an infected mother has attained some prominence, but Still is of the opinion that clinical evidence seems to show that a syphilitic father can beget an infected infant without giving the disease to the mother, and that it is "no uncommon occurrence." On points like these and others there are reasonable grounds for differences of opinion, but in a work founded mainly on his personal experience it is an advantage to have a definite pronouncement of his views from the author. A valuable feature of the work is the space devoted to treatment, which is clearly and fully discussed. Its misleading title apart, we have nothing but commendation for the book. Like the rest of the Oxford Medical Publications, its get-up could hardly be improved upon.

La pratique des maladies des enfants, diagnostic et thérapeutique, is a large and comprehensive work in six volumes by a number of French writers, under the general editorship of Dr. R. CRUCHET. The first volume, *Introduction à la médecine des enfants*, by Drs. MARFAN, ANDÉRODIAS, and CRUCHET,[7] deals with hygiene, feeding, growth, puberty, and diseases of the newly-born. In the ample space allotted to each, all the subjects are adequately dealt with. Under the head of Hygiene Dr. Cruchet not only treats of the usual subjects of feeding, clothing, bathing, and sleep in children at different ages, but of those less frequently dealt with—such as studies, games, holidays, journeys, and general matters of education. On the whole his views are sound and judicious, but the advice to keep children away from others in public places on account of the danger of infection would seem not only difficult of attainment, but prejudicial to the general interests of the children. The disadvantage of the occasional incurrence of disease by the few is small as compared with the advantage and pleasure gained by the many from mixing with their fellows. The sections on diseases of the newly-born, by Dr. Andérodias, are excellent, and more complete than in most works of the sort. In dealing with the question of a seemingly healthy mother suckling her infant, who is the subject of inherited syphilis, Dr. Andérodias states his belief in the occurrence of undoubted exceptions to Colles's law. Such exceptions are, however, he considers, so extremely rare that the slight risk of contagion ought to be incurred by the mother on account of the great advantage to the infant from maternal feeding. The subject of growth is, perhaps, overdone. The elaborate tables in this and some other recent works dealing with the growth of every part and organ of the body at each year of age have more interest for the anthropologist and statistician than advantage for the practical physician. Dr. Cruchet regrets that the important epoch of puberty has received insufficient attention at the hands of most authors, and has taken care that no such charge can be laid against himself. The list of disorders he associates with puberty reads almost like pages from a nomenclature of diseases. We cannot think, moreover, that such complaints as salpingitis, ovaritis, uterine flexions, vulvo-urethritis, and mammary abscess in the female, and balanitis, urethritis, orchitis, and spermatorrhoea in the other sex, are much more frequent at times of puberty than mere coincidence would account for. The first volume has led us to expect with interest the remaining parts of the work.

In *Surgical Diseases of Children*[8] Dr. SAMUEL KELLY has put forth a treatise on the present aspect of surgery as applied to children. His attempt is ambitious, and he has evidently sought to include in this rather bulky volume every affection and every kind of disease which either specially affects children or acquires certain characteristics in the child. The result is that the treatment of the subject is unequal. It is obviously impossible to compress, even within the limits of a treatise like this, and to do full justice to, all the observations which have accumulated so rapidly in recent years. A careful perusal of the work, however, with the object of ascertaining if the most modern views of treatment are adequately described, convinces us that Dr. Kelly has been at the greatest pains to bring his work fully up to date. We may instance the discussion on the value of tuberculin, the seven pages devoted to the opsonic treatment of infective diseases, the clear description of Bier's methods, the results of tendon transplantation and nerve transference, and the capital summary of the recent literature on the status lymphaticus. The book shows certain defects in orthography. For instance, we notice that Dr. Barlow is described as being of "Great Ormand Street," Furneaux Jordan is spelt "Furneux-Jordan," and Nélaton is spelt "Nelaton." We confess, however, to a sympathy with these slight errors, for who that has gone through the sustained weariness of writing a book does not know how difficult it is to avoid them? The work bears the impress of much personal observation and careful work, and the author's conclusions are expressed in crisp and concise language. Speaking of the treatment of spinal caries, after alluding to the necessity of complete rest, he says:

> In practice various modifications are in vogue, concessions to the wishes of the friends or of the patient, but that does not alter the principle involved, and I am quite certain from personal observation that many a case of spinal caries which might have been cured within a reasonable time with a little suffering and slight resulting deformity, has been dallied with in half-way measures until abscess, kyphosis, and nervous phenomena have demonstrated serious advances of the disease, and for ever precluded a satisfactory course and termination.

We have already remarked that on account of the diversity of subjects treated the book is unequal in parts, and deformities is the subject which receives the least attention. We venture to think it would have been wiser to have dealt with these in a separate volume. However, our criticisms are of slight importance compared with our

[7] *La pratique des maladies des enfants, diagnostic et thérapeutique.* Vol. I. *Introduction à la médecine des enfants.* Par A. B. Marfan, J. Andérodias, et René Cruchet. Paris: J. B. Baillière et Fils. 1909. (Roy. 8vo, pp. 480; 71 figures. Fr.10.)

[8] *Surgical Diseases of Children.* A Modern Treatise on Pediatric Surgery. By Samuel W. Kelly, M.D., Professor of Diseases of Children, Ohio Wesleyan University; President of the Section of Children, American Medical Association, 1901. New York: E. B. Treat and Co. 1909. (Large octavo; 738 pages; 293 illustrations. Price 5 dollars.)

sense of appreciation of the value of the work, which, we believe, will take a high place in the literature dealing with surgical diseases of childhood.

THE CAMBRIDGE NATURAL HISTORY.

AT last volume iv of the *Cambridge Natural History* has appeared,[9] and the whole series of ten volumes is now complete—fourteen years after its commencement. The greater delay in the appearance of this volume has been due principally to the untimely death of Professor W. F. R. Weldon, who was writing the section on the Crustacea. The volume deals with the Crustacea and the fossil Trilobites, and with the Arachnida and allied groups, such as Tardigrada, Pentastomida, and Pycnogonida.

On the death of Professor Weldon, the editors commissioned Mr. Geoffrey Smith of New College, Oxford, to carry on the unfinished work on the Crustacea, and his task was rendered the more difficult owing to the fact that Professor Weldon had written a part, but had not sketched out a definite plan for the whole of the work. Mr. Geoffrey Smith has, however, done his work exceedingly well. Professor Weldon's bionomical notes on the Branchiopoda—the only group upon which he had written—serve to show what a superb naturalist was lost in him. The chief defect in the essay on the Crustacea is, we think, the want of a detailed statement on the life-history, and from one or two references in the chapter upon the Branchiopoda it seems to us that Professor Weldon had intended to include such a statement in his introductory chapter. Mr. Geoffrey Smith has distributed this important subject under the different sections, so that the general questions of development and metamorphosis and the significance of the moult have been passed over.

It is strange how frequently an expert upon a group either fails to recognize the importance of, or is ignorant of, the "Britannic" distribution of his more interesting species. Professor Weldon states that the only recorded British Phyllopods are *Cheirocephalus diaphanus*, *Artemia salina*, and *Apus cancriformis*, although *Lepidurus (Apus) glacialis* has been found in the Scottish lake deposits. Mr. Geoffrey Smith mentions that *Mysis relicta* occurs in Lough Erne, although its best known habitat is Lough Neagh, and it has also been found in, and recorded from, Loughs Corrib, Derg, and Ree. The woodlouse *Platyarthrus hoffmannseggii*, which lives in ants' nests, is referred to as occurring "in England and Northern Europe," although it has been recorded also from two localities in Scotland, and at least five in Ireland. On the other hand, the general subject of the distribution of the Crustacea has been dealt with very well in Chapter VII by Mr. Geoffrey Smith.

With regard to the Arachnida, a short general introduction is followed by two excellent chapters dealing with the King-crabs and their allies the Eurypterida. The scorpions, spiders, mites, etc., are discussed in about 170 pages, and this part of the work is too much cut down. For instance, the Hydrachnida, about which a considerable amount is known, are dismissed in eight lines. The description of the habits of *Atypus*, the nearest British relation of the "trap-door spiders," is most meagre. After stating that the spider spends almost the whole of its existence in its tube, "the extremity of which is always found to be closed," it is mentioned that its food is probably almost entirely earthworms, a statement which we venture to think is not correct, as Enoch and others describe its food as consisting of insects, especially flies. How the spider catches its prey by piercing the tube and insect with its chelicerae, and how, after pulling in the captive, she repairs the rent in the tube, is not mentioned, and the reader is left to wonder how a spider inside a closed tube catches earthworms which are outside the tube! The statement (p. 373) that spiders which mimic ants are enabled by their disguise to approach their prey, which take them for harmless ants, seems to assign to the insect brain a greater power of discernment than is warranted, especially as we do not yet know to what extent an insect "sees" with its compound eyes.

The originators of this splendid series, the *Cambridge Natural History*, have given us ten volumes covering the whole of the animal kingdom. But "natural history" is not limited to zoology. Could not the editors commission a few expert botanists to give us a few botanical volumes on the same lines? Such a botanical treatise would be extremely welcome, and would, like the zoological volumes in their sphere, fill a very obvious gap in botanical literature.

[9] *Cambridge Natural History.* Vol. IV. Crustacea, Arachnida, etc. London: Macmillan and Co. 1909. (8vo, illustrated. 17s. net.)

THE POOR LAW COMMISSION'S REPORTS.

SIR OLIVER LODGE in his introduction to PROFESSOR MUIRHEAD'S book *By What Authority?*[10] rightly describes it as "a careful and balanced summary" of the proposals of the Majority and Minority Reports of the Poor Law Commission. But it is even more than that, for Professor Muirhead, taking a perfectly unbiassed and philosophic standpoint, first analyses the ground principles on which the two reports are founded and afterwards in a very practical way criticizes the strong and the weak points in each. He sets aside entirely ideas that so readily occur on a superficial view of the two schemes, such as the statement that the Majority is determined to free the new public assistance authority from all electoral control, and is only a replica of the Charity Organization Society, and the suggestion that the Minority Report is simply socialism; and he finds the real line of division in the proposal of the Minority for a "break-up of the Poor Law" by division of the functions of the present Poor Law authority. In discussing the rival proposals, Professor Muirhead groups under four heads the questions that present themselves:

1. Is an authority appointed on the analogy of the Education Committees the best to deal with poverty, or would the duties best be divided between existing committees of the councils?
2. Ought voluntary agencies to have separate functions co-ordinate with the public authority, or ought they to be strictly subordinate to the official machinery?
3. In medical relief, ought a large place to be assigned to voluntary institutions, or ought the public health authorities to take over the whole of medical relief to the obliteration of the distinction between medical inspection and medical attendance?
4. Ought the municipal authorities to be responsible for all forms of poverty, or are there some forms that can only adequately be undertaken by the nation?

On these questions the reports fall widely apart, as the Majority is said to prefer the former of each pair of alternatives and the Minority the latter. A considerable part of the book is devoted to the causes of poverty and unemployment. It is, perhaps, to be regretted that the subject of medical relief is only dealt with in a scanty way, but Professor Muirhead points out that the two reports start from a radically different standpoint. This fundamental difference is well summed up as follows:

> Both reports adopt the public good as the criterion of efficiency; the difference is that the horizon of the Minority is filled by the immediate consequences to society of the efficient treatment of cases as they occur, the Majority holds that the public good will be best served in the long run by setting up in individuals and classes a certain attitude of mind towards their own and their children's health and towards the opportunities of medical assistance that modern society affords.

In conclusion the author suggests a combination of the separate merits of each report and hopes that discussion will be maintained on the high non-political level on which the Commissioners have placed it. The book is exactly what is needed by any one who approaches the subject without any preconceived bias of individualism or of collectivism. A useful bibliography is given of works dealing with the subject and of the appendix volumes to the reports.

[10] *By What Authority? The Principles in Common and at Issue in the Reports of the Poor Law Commission.* By J. H. Muirhead, LL.D., Professor of Philosophy at the University of Birmingham, with an introduction by Sir Oliver Lodge, LL.D. London: P. S. King and Son. 1909. (Demy 8vo, pp. 90. 2s.)

NOTES ON BOOKS.

MOOR AND PARTRIDGE'S *Aids to the Analysis of Food and Drugs*[11] is a third edition of Pearmain and Moor's little book of the same title. In a prefatory note the authors state that so many new processes and improvements have

[11] *Aids to the Analysis of Food and Drugs.* By C. G. Moor, M.A.Cantab., F.I.C., and William Partridge, F.I.C. Third edition. London: Baillière, Tindall and Cox. (16mo, pp. 249.)

appeared since the last edition that revision has practically amounted to rewriting. It is, of course, impossible in a small book of this kind to give anything like a complete account of the analysis of all the substances dealt with, which include most ordinary articles of food, some drugs, soaps, disinfectants, and urine; but good judgement has been shown in selecting the essential matters to be included under each heading, and a very useful little work is the result. We have not found any section in which the information is not fairly abreast of current knowledge.

NOTES ON HEALTH RESORTS.

VERNET-LES-BAINS, PYRENÉES ORIENTALES.

By G. H. BRANDT, M.D.

I HAVE had the good fortune during my autumn holiday of visiting a most interesting part of France, that which lies at the extreme south and eastern part of the department of the Pyrenées Orientales bordering on the Spanish frontier. Vernet, the most southern of the winter resorts of France, is situated in a winding valley at an altitude of over 2,000 ft. in the midst of a circle of mountains, and sheltered from the Roussillon winds by the Canigou, 9,000 ft. high.

The Romans have left traces of their passage, and in the twelfth century the Abbots of St. Martin du Canigou had at Vernet a small thermal bathing-place. Since that remote epoch Vernet, with its numerous thermal sulphurous springs, owing, no doubt, to its proximity to the celebrated medical school of Montpellier, gradually developed, but it is only within the last few years that the late Count Henry de Burnay took it up, and by his intelligent outlay made it one of the most luxurious spas in France.

If we consider its altitude, its sheltered position amongst mountains covered with pine forests, its sunny aspect and dry atmosphere, one may claim for it the title of a temperate climate in summer and a mild and reposeful climate in winter. Snow and frost are rare.

Vernet possesses twelve springs of mineral water, varying in temperature from 47° F. to 150° F. The waters are unctuous to the touch and almost inodorous; the taste is not disagreeable. All the twelve springs agree in being sulphurous and alkaline; one is also ferruginous.

The climatic conditions and waters of Vernet are especially serviceable in cases of rheumatic arthritis and of chronic rheumatism, nervous and general weakness, and in catarrhal affections of the respiratory tract.

At Vernet-les-Bains there are, in a well laid-out and finely-timbered park, beautiful hotels, furnished villas and flats, with all the comforts that modern science has devised—perfect drainage and abundance of pure spring potable water, central heating, electricity, lifts, etc. A dairy is attached to the establishment, with healthy cows. Excellent walks, fishing, and shooting can be found in the neighbourhood. Picnics, excursions, dances, and musical entertainments frequently take place during the season. A library of French and English books is maintained by the establishment; and games, both indoor and outdoor, are provided.

During the last ten years there have been per annum 37 wet days, 44 cloudy, 121 with some clouds, and 163 without clouds. The sudden change of temperature and the damp and chilly sensations felt on the Riviera do not occur, a fact which may, I believe, be accounted for by the dry, porous granite soil with a dry atmosphere and the absence of wind and fog at an altitude of over 2,000 feet.

The vine, the fig, the olive, the pomegranate, the clematis, the zeutique of Algeria and the Grecian Isles, the oleander as well, and many other plants from Italy, Malta, and Algeria, with a variety of palms, thrive, and the delicate mimosas are in blossom almost all the winter in the Alzina Gardens.

Vernet-les-Bains is not an expensive place, and is easily got at by through carriage from Paris (Quai d'Orsay). The managers have made arrangements to suit all purses, giving most excellent and comfortable accommodation with the best food, and are always ready to supply full information to all inquirers.

MEDICAL ORGANIZATION IN CASE OF INVASION.

ENGLAND AND WALES.

THE Secretary of State for War issued on August 16th to secretaries of Territorial County Associations in England and Wales a Scheme for the Organization of Voluntary Aid for sick and wounded in the event of war in the home territory.

The scheme proposes to make use of the existing organization of the British Red Cross Society and to develop it on a large scale, so that it shall comprehend every district in England and Wales. The help of the St. John Ambulance has also been secured for the training of detachments. A county system has been adopted because it is that upon which both the Territorial Force and the British Red Cross Society are organized.

Each County Association is charged with the responsibility of organizing voluntary aid in the county, and is required, through the local branches of the British Red Cross Society, to form Voluntary Aid Detachments. There need be no limit to the number of such detachments, but those in each county would be under the command of a County Director.

The whole organization is intended to provide supplementary aid to the Territorial Medical Service to meet the needs of war at home, and is modelled to a large extent on the Japanese system, a memorandum on which by Lieutenant-Colonel W. G. Macpherson, C.M.G., R.A.M.C., is given in an appendix to the scheme. In another appendix is given a sketch of the existing military organization of the Territorial Force, which it will be useful to reproduce in full:

EXISTING ORGANIZATION OF THE TERRITORIAL MEDICAL SERVICE.

"The medical service of the Territorial Force is modelled on that of the Expeditionary Force of the army, with the essential difference that it is organized for active service in home territory only. Its ranks include all that highly-trained personnel which is necessary for the preservation of the health of troops in the field and for the professional treatment and care of the sick and wounded. Being an integral part of the medical service of the army as a whole, its technical training is in the hands of the Director-General, Army Medical Service, assisted by his representatives, the Administrative Medical Officers of Territorial Divisions; these latter being themselves Territorial Officers, who are each allowed a retired officer of the regular Royal Army Medical Corps to assist him.

"To give expert advice on sanitary matters, and to assist the Administrative Medical Officers in the prevention of disease, officers who, from the nature of their civil duties, have special knowledge of the science of public health and sanitation, are appointed to the head quarters of each Territorial Division. In addition, over 100 sanitarian and medical officers of health throughout the United Kingdom have been given commissions and will be available in war for duty as sanitary officers with the Territorial Force within their own areas.

"In the Expeditionary Force each battalion has one officer, one corporal, and four privates Royal Army Medical Corps, attached to it. In addition to this medical establishment in the Territorial Force, a battalion has an extra medical officer. This—the only difference in the organization of the Territorial medical service with combatant units—is in order that by arrangement between two medical officers, the requirements of their practices may not be unduly interfered with in time of peace by their military duties. The medical officers examine the recruits of their battalion, train the regimental stretcher-bearers and men for sanitary duties, and supervise the duties of the Royal Army Medical Corps attached. In camp and in the field, the medical officer with the battalion is assisted in the prevention of disease by the Royal Army Medical Corps rank and file attached, whose special duty it is to purify the drinking water, and who also assist him in carrying out the work of disinfection as well as his duties towards the sick. The battalion provides him with a lance-corporal and a private, the latter to

drive the cart containing the regimental medical equipment, the former to act as his orderly. Also from the battalion come 16 stretcher-bearers (2 per company), and 1 non-commissioned officer and 8 men trained in sanitary duties; these latter supervise the disposal of refuse, sullage, etc., and act as sanitary police. Other units have a similar regimental medical organization in proportion to their size. Two special companies for sanitary duties only are organized in the London divisions.

"The sick and wounded in the field are taken over from the regimental medical service by the field medical units, that is, mounted brigade field ambulances specially organized for service with mounted brigades, 1 to each; and field ambulances for divisions, 3 to each. Each consists of a portion designed especially for rendering first aid and carrying wounded (the bearer division), and a portion organized more on the lines of a hospital in the field (tent division). Both are divisible into self-contained sections, capable of working independently.

"Each mounted brigade field ambulance has a personnel of 6 officers (one may be a non-medical transport officer) and 103 non-commissioned officers and men of the Royal Army Medical Corps, to which are added 2 drivers of the Army Service Corps. A field ambulance has 10 officers, of whom one is a quartermaster, and one may be a non-medical transport officer, and 220 other ranks Royal Army Medical Corps, with 3 drivers Army Service Corps. Both units have in peace time sufficient equipment and transport to ensure the training of the personnel in their duties. These, in general terms, are the collection and removal of sick and wounded from the battle-field, but it is an essential part of the requirements of the fighting force that the ambulance wagons of a field ambulance must never be detached in removing wounded to such a distance as would prevent them rejoining their unit the same day.

"In the Expeditionary Force, but *not* in the Territorial Force, wounded are taken over from field ambulances by a special mobile unit, the Clearing Hospital, mobilized in the proportion of one to each division. Its special duties are to receive the wounded and care for them until they can be evacuated by road, rail, or water transport to hospitals at the base.

"The remaining unit to be described is the General Hospital. Of these there are 23, located in centres where large civil hospitals or medical schools already exist. Recognizing that much of the work required from such an institution is very similar to that of a civil hospital, the medical and surgical staff, as well as the female nursing staff, are not called upon for duty in time of peace, and the number of these staffs commissioned or enrolled, is largely in excess of requirements on mobilization for reasons similar to those which permit two medical officers to a Territorial battalion. On the other hand, being a military unit, and as such responsible that the needs of the army are fulfilled, a special nucleus staff of three officers and 43 non-commissioned officers and men is trained in time of peace in the administration of large military hospitals, with special regard to the functions of a general hospital in war. As this nucleus undergoes annual training in military hospitals, it does not require equipment for instructional purposes in peace time. Similarly, the matrons of the nursing service go through short courses in the management of the nursing arrangements of a military hospital. The remainder of the personnel required to bring a general hospital up to war strength is 66 privates, who do not necessarily require to have been trained in military duties in peace time. A general hospital in the Territorial Force has neither equipment nor buildings in time of peace."

LOCAL ORGANIZATION OF VOLUNTARY AID.

This organization, it is considered, is sufficiently complete and elastic to meet the immediate requirements of the combatant troops on the march and in action, and to provide for many of the requirements of the hospitals to which sick and wounded will be conveyed. But the organization lacks several of those parts which are provided for in all other home defence armies and also in the Expeditionary Force. This incompleteness is intentional, because it was desired that every opportunity should be given to the British Red Cross and other Societies to take a share in the work appropriate to those who in all civilized countries seek to mitigate the lot of the sick and wounded in war. Speaking generally, there is at present no personnel for organizations connecting the field ambulances with railway lines, ("clearing hospitals"); there is no personnel organized for rest stations or temporary hospitals, ("stationary hospitals") along routes of evacuation; no personnel for the expansion of general hospitals, and for the most part, buildings for such hospitals have not been chosen.

The scheme now issued is devised specially to provide a system for the removal of the sick and wounded from the field ambulances to the lines of railway, and thence to the general hospitals.

Removal of Sick and Wounded from Ambulance to Hospital.

The duties connected with the removal of sick and wounded from field ambulances to general hospitals are enumerated as follows:

1. The preparation of country carts and other vehicles provided by transport authorities for the removal of patients lying down.
2. Improvising stretchers, etc., for the transport of very severe cases by hand.
3. The conversion of country houses, farms, public buildings, or, in fact, whole villages or small towns into temporary hospitals for the care and shelter of sick and wounded until they can be placed on railway trains for conveyance to general hospitals.
4. Similar utilization of local resources for the care of trivia cases of sickness or wounds in the vicinity of field operations.
5. The formation of rest stations along lines of evacuation, either by road, rail, or water, where sick and wounded may receive rest and refreshment, or, if necessary, accommodation over-night; or where they may be made comfortable while waiting to be loaded on trains, or after they are taken off trains.
6. The formation of evacuating stations at rail-head or its vicinity, where sick and wounded can be classified as regards the kind of accommodation required on ambulance or other trains previous to being sent away to the general hospitals. These evacuation stations are practically expanded rest stations.
7. The formation of similar stations at points where it may be necessary to redistribute the sick and wounded, in order to send some to one general hospital and some to another. These distribution stations are also expanded rest stations.
8. Local arrangements for transport of sick and wounded from railway stations to hospitals or other medical posts, and vice versa.
9. The provision of a personnel for accompanying the sick and wounded during conveyance by road or rail.
10. The fitting out of empty goods vans or other rolling stock for the transport of sick and wounded by rail.
11. The collection and distribution of material for clearing hospitals and rest stations, and management of dépôts of such material.

VOLUNTARY AID DETACHMENTS.

The Voluntary Aid Detachments are to supply the personnel for the discharge of these duties. The detachments should be of two classes, consisting respectively of men and women, and should be so arranged that each could be divided into two. The training and equipment of the detachments is to be carried out in a manner to be prescribed by the British Red Cross Society, but they will be inspected periodically by military authorities. The training of the detachments should be such as to enable them to utilize local resources for improvising accommodation and transport of wounded, and for providing for their temporary care and treatment until they reach the general hospitals. Men's detachments would therefore be specially trained in transport of wounded, and women's detachments in the preparation of food and in nursing duties.

Each local Voluntary Aid Detachment is to be organized on the following system:

MEN'S DETACHMENT, BRITISH RED CROSS SOCIETY.

*1 Commandant.	
*1 Assistant Commandant.	(To command half detachment in event of detachment being divided into two.)
2 Medical Officers.	
1 Quartermaster.	
1 Assistant Quartermaster.	(Quartermaster of half detachment in event of division.)
2 Pharmacists	(One of each for each half detachment.)
2 Assistant Pharmacists ...	
4 Under Officers	(Two for each half detachment, and 1 for each of 4 sections of 12 men.)
48 Men.	

* If possible an officer R.A.M.C. or R.A.M.C.(T.), or other officer with military training.

WOMEN'S DETACHMENT.

1 Commandant (Medical Officer).
1 Assistant Commandant (Medical Officer).
1 Quartermaster.
1 Assistant Quartermaster.
2 Lady Superintendents.
20 Women (of whom two should be fully-trained nurses).

The detachments should be trained to make use of local resources for improvising stretchers and means of carrying wounded on various kinds of vehicles, and for converting local buildings into suitable shelters for sick and wounded, the manual entitled *Royal Army Medical Corps Training* (1908) being used as a guide until a special manual is issued. A squad of four men so equipped should have with it material for preparing improvised stretchers out of local material, for fitting out vehicles according to improvised methods for carrying wounded lying down, for putting together any number of improvised cots for the temporary accommodation of wounded in empty buildings, halls, or other suitable shelters, during the period that must elapse before better and more suitable hospital equipment can be brought up, and for any kind of improvised work of this nature.

On mobilization an officer, preferably a retired officer R.A.M.C., would be appointed to each Division of the Territorial Force to act as Director of Clearing Hospitals, and would be assigned to the lines of communication, a certain number of Voluntary Aid Detachments being placed at his disposal in the proportion of one detachment at least for every field ambulance to be cleared by him; those first appointed would be drawn from the immediate neighbourhood; but other detachments from counties behind the operations should, according to circumstances, be available for reinforcing them. The detachments not so employed would be available at other places throughout the country for carrying on the functions of rest station and of local transport from the railway station to the general hospitals, or for providing a personnel to ambulance trains, etc. They might also be employed in connexion with the establishment of convalescent dépôts, in preparing means of transport by road, in converting local buildings, villages, etc., into suitable clearing hospitals, evacuation stations, etc., and in establishing hospitals for the slightly wounded near the area of operations. The men should be trained as stretcher bearers, and to a certain extent as male nurses; others should be trained as clerks and in sanitary work—such as disinfection of buildings—and each detachment should include some men who are expert carpenters or mechanics.

The women's detachments would be employed chiefly in forming railway rest stations, for preparing and serving meals and refreshments to sick and wounded, during process of evacuation by railway, and for taking temporary charge in the evacuation stations or temporary hospitals of severe cases unable to continue the journey. The members should therefore be trained not only in cooking and preparation of invalid diets, but in arranging small wards for patients in suitable buildings, preferably near a railway station, and in such nursing as is necessary for the temporary care of patients until they can be transferred to a hospital. Half detachments might be employed for duty in ambulance trains. A women's detachment should also be available for nursing and cooking duties in clearing hospitals prepared by men's detachments.

Summarizing the duties it will be seen that if fully trained in time of peace, voluntary aid detachments will be capable of fulfilling three separate functions:

1. The formation of clearing hospitals if they are in the immediate neighbourhood of the fighting forces (say, within ten miles).
2. The formation of temporary hospitals, rest stations, or collecting and evacuating stations.
3. Affording supplementary aid to clearing hospitals in advance of them, and nearer the scene of action.

It is pointed out that without instruction, training, and practice in time of peace the detachments could not be immediately efficient, and immediate efficiency is of the greatest importance. A complete acquaintance with the work to be done and the method of doing it will alone, it is pointed out, produce that absence of confusion and uncertainty which is the purpose of organization in time of peace. It is imperative, therefore, that every county should form many Voluntary Aid Detachments, that those who undertake their formation should first make themselves acquainted with the details of similar organizations in other countries; that courses of lectures should be given frequently on (*a*) improvisation of apparatus for the transport of sick and wounded; (*b*) first-aid nursing; (*c*) practical demonstrations in the several varieties of work to be done, depending, of course, upon local opportunities.

Local Committees.

It is suggested that some members of the County Association should be co-opted on to the committees of the local branches of the British Red Cross Society, and the Ambulance Department of the Order of the Hospital of St. John of Jerusalem in England is prepared to organize a special branch in connexion with its centres and various other units throughout the country to meet the preliminary educational requirements of the Voluntary Aid Detachments. County Associations in England should, therefore, arrange that all persons wishing to join a Voluntary Aid Detachment should be in possession of both first aid and field nursing certificates of the St. John Ambulance Association.

Members of aid detachments will not be required to wear any specific uniform, but to each individual will be issued an identity certificate, and will be entitled to wear a brassard, without which he or she will not be "recognized" by belligerents.

GENERAL HOSPITALS.

With regard to the organization of general hospitals, certain information is now given supplementing that given in the Circular Memorandum No. 31. A County Association may delegate the selection of buildings in time of peace for the general hospitals to be established on the outbreak of war, but the choice must be made after consultation with administrative medical officers, sanitary officers of the Territorial Force, as well as with the organizing matron; and the concurrence of the Commander-in-Chief is essential; for the conditions to be satisfied (nearness to railway, width and number of staircases, water supply, lighting, drainage, etc., ease of reappropriation, grounds surrounding for hut annexes, sanitary annexes, etc.), are numerous. Buildings selected as suitable must be equipped immediately on the mobilization of the Territorial Force.

The County Associations responsible for the formation of the twenty-three hospitals should therefore be prepared to equip buildings, and have their hospitals ready to receive patients in one week from the date of mobilization. This can only be accomplished by a perfectly organized system. The minimum equipment required is given in an appendix. The source from which this equipment is to be provided is a matter which will now rest with County Associations. The question is often asked as to whether non-perishable articles of equipment should be stored in time of peace. No purchases should be made from Government funds in time of peace, but provisional arrangements should be made for the supply of the required equipment or mobilization of the Territorial Force in time of national danger. It is understood that in this direction something has already been done. The County Association should satisfy itself that the conditions are efficient, and it is considered that the ideal system is to be prepared to store articles of equipment, the gifts either of individuals or societies, and any local organization desiring to collect and store equipment in time of peace, and to defray the expenses incidental thereto, should be encouraged. The feeding of patients in Territorial general hospitals does not concern the voluntary aid organizations, being a duty devolving upon the Army Service Corps, but arrangements should be made for the reception of food or clothing which the Red Cross Society may supply. With regard to the transport of sick and wounded, the provision of vehicles, whether by rail, road, or water, rests with the transport branch of the Quartermaster-General's department in consultation with administrative medical officers. When vehicles have been supplied, it is the duty of the trained personnel to adapt them at once to the requirements of the sick and wounded if they have not already been provided with the necessary appliances, and so that this can be quickly accomplished, training and education of the aid detachments in time of peace is essential. Aid detachments should be well acquainted with the various methods which have been devised, as well as with

the method of loading and unloading. While, however, the aid detachments are not concerned with the provision of vehicles, etc., there is no reason why local effort should not provide for the organization of a complete sick transport service of ambulance wagons, horsed or motor, cycle stretchers, ambulance trains, etc., if the zeal and earnestness of individuals and societies are equal to perfecting such a system. But whenever proposals which proceed beyond the supply and technical training of transport personnel are made to County Associations, these should be submitted for the sanction of the Army Council, and all the arrangements made by a County Association will, when complete, be inspected by an officer deputed by that Council.

Training.

The St. John Ambulance Association has issued a memorandum embodying a scheme for the preliminary instruction of voluntary aid detachments. It is proposed to establish in each county a section of the Territorial Branch of the St. John Ambulance Association for the purpose of forming classes for instruction in first-aid and nursing. The section will be double, for men and women respectively, the former being presided over by the Lord Lieutenant and the latter by his wife. The duties in which the members of the Voluntary Aid Detachments will be instructed under the scheme are as follows:

(*a*) Preparing vehicles provided by the military authorities for removing patients lying down.
(*b*) Improvising stretchers and other means for severe cases carried by hand.
(*c*) Converting country houses, farms, public buildings (whole villages and small towns) into temporary hospitals while waiting for transport.
(*d*) Utilizing local resources for trivial cases.
(*e*) Forming rest stations *en route* for refreshment or accommodation over-night while waiting for transport.
(*f*) Forming evacuating stations (expanded rest stations) at rail-head for classifying sick and wounded for transport.
(*g*) Forming redistribution stations (expanded rest stations) where required—that is, chiefly at railway junctions, for transport of sick and wounded to selected general hospitals.
(*h*) Making local arrangements for transport from railway stations to hospitals and medical posts and vice versa.
(*i*) Providing personnel for accompanying sick during conveyance.
(*j*) Fitting out empty vans and rolling stock for transport by rail.
(*k*) Collecting and distributing material for clearing hospitals and rest stations, and managing dépôts thereof.
(*l*) Conducting convalescent homes.
(*m*) Caring for invalided men at their own homes.

THE BRITISH RED CROSS SOCIETY.

The British Red Cross Society, formed by the fusion in 1905 of the British National Society for Aid to the Sick and Wounded in War and the Central British Red Cross Council, was incorporated by Royal Charter last year. The National Aid Society gave assistance to the wounded of all nations, whether the British were concerned in the war or not, but the British Red Cross Society, owing to the improved organization in foreign countries, confines its activities to the British Empire. The society is governed by a council appointed by the King and Queen, of which Lord Rothschild is president, and Sir Frederick Treves is chairman of the executive committee. The society has branches in 39 counties in England, in 3 counties in Wales, and in 12 counties in Ireland. In Scotland there is a Scottish branch with a representative council appointed by Her Majesty the Queen. The Scottish branch has local branches in 31 counties and 5 cities, and the organization of the society in Scotland is probably better developed than in England or Ireland. The society has also a Canadian branch and a Cape of Good Hope Branch.

THE FUTURE OF PREVENTIVE MEDICINE.

AT the recent Health Congress at Leeds, Dr. Arthur Newsholme, medical officer to the Local Government Board, delivered an address on social efficiency in relation to public health administration. With wider and more exact knowledge of hygiene, it was, he said, becoming increasingly realized that the whole range of the mental, physical, and to a large extent the moral, life of mankind might be brought within the range of preventive medicine; and that as medical knowledge grew the number of diseases that could be regarded as preventable would increase, and public administration extend beyond its present limits.

The Interdependence of Social Evils.

A wide outlook, as well a high ideal, was needed if social amelioration was to be secured to the extent well within reach. A worker in local health administration was concerned with the remedial treatment and prevention of all forms of distress, whether mental, physical, or moral, these being so closely inter-related as not to be completely separable. Instances of the need for this wider outlook would occur to every one (medicine itself had furnished many—charlatans without exact knowledge, and specialists who knew one thing almost too well but ignored the relationships of their special knowledge to the individual patient); but all were now realizing such points as that the treatment of the underfed and ill-clad child was merely a part of a larger problem concerning family and industrial conditions, and that alcoholism likewise was connected therewith and not simply an outcome of conviviality and the number of public-houses.

Owing to this interdependence of social evils, the medical officer of health most successful in his work was one who impressed upon all the local authorities—sanitary, educational, and parochial—of his district, the inter-relation of their work, and called to his aid the united effort of those authorities and of the numerous voluntary agencies who were seeking out the evils of municipal or domestic uncleanliness, of overcrowding and defective housing, of insufficient and belated care of the sick, and trying to secure the beneficial results obtainable from the best methods of education and recreation.

The more accurate knowledge of to-day—and this wider outlook—would mean the abandonment of the old hand-to-mouth and empirical method of dealing with social evils. Poverty and destitution were a complex compound, not, as had been believed, a simple element, and with this erroneous idea would disappear the sort of administration which supplied doles to relieve symptoms of destitution, without making efficient effort to investigate its varying causation or to prevent its recurrence.

The Evolution of Preventive Medicine.

After showing that a desire to see such causal treatment of social evils undertaken was evinced in the Poor Law Commission's report, Dr. Newsholme remarked that preventive medicine had passed through two stages. First came the crude idea that local sanitary conditions, irrespective of specific infection, caused epidemic diseases. Then came a recognition of the need for medical organization for the treatment of infectious diseases by way of protecting the community. A point had now been reached when the distinction between communicable and non-communicable diseases was being disregarded, since both were of equal interest to the community. Social inefficiency was caused by every form of sickness in proportion to its duration and severity, and since the prompt and early treatment of disease was one of the chief means of securing social efficiency, the chief object of the preventive medicine of the future must be the better communal organization of the treatment of the sick.

After further discussing the inter-relations of poverty, sickness, and like conditions, Dr. Newsholme said that it was evident that administration was evolving in the direction of a medical service in which treatment would be regarded as a part of preventive medicine, the economic justification of any increase in first cost being found in the decrease of sickness which must follow and be followed in its turn by a lessened aggregate of poverty and social inefficiency.

To secure efficient and economic administration the whole ground must be covered, and there must be no overlapping of effort. The most active and complete co-ordination of workers must be secured, and the officers employed must be efficient. In respect of sanitary officers, efficiency in most instances implied the confinement of their efforts to discharge of public duties and their freedom from subjection to the disturbing and sometimes incompatible distraction of private practice of any kind. In this connexion it was an anomalous and remarkable fact that while district medical officers and others could only be removed from office with the consent of the Local

Government Board, the majority of the medical officers of health throughout the country were subject to election at intervals. The arrangement in many instances endangered the re-election of efficient officers at the expiration of their limited term of office. Conditions of appointment which enabled more satisfactory sanitary work to be accomplished had been secured for medical officers of health in London, and in a certain number of combined districts, and in respect of county medical officers the same result would follow the passing of the Housing Bill. Efficient sanitary administration demanded the extension of similarly satisfactory conditions of tenure of office for medical officers of health throughout the country, and the most satisfactory settlement of the problem would come in connexion with the establishment of efficient units of local government.

Combination of Duties.

In further allusion to the future, Dr. Newsholme, after mentioning the anomalous fashion in which the public medical work of the country is split up amongst the officers of various authorities, said that in the past the combination of the posts of medical officer of health and of district medical officer in one person had commonly not worked well, but there had been, he believed, no attempt in districts of suitable size to place the combined duties of the two offices in the hands of a whole-time officer possessing the D.P.H. and security of tenure of office, and doing his work under the chief medical officer of health of the country. The present stumbling-block in the way of action in this direction was the common non-coincidence of sanitary and Poor Law areas.

Happily active co-operation had been arranged between medical officers of health and school medical officers, and thus had opened up prospects of extending the work in preventive medicine, the full importance of which had not hitherto been realized. There was even greater scope for economical combination of officers and active co-operation among non-medical public health workers and in scattered districts. In the latter the qualified inspector of nuisances, for instance, might often with advantage be also relieving officer, or vaccination officer, or assistant registrar of births and deaths. At present one often found in the same district a school attendance officer (who, outside autonomous education areas, was under the County Council), an inspector of nuisances, who was under the local sanitary authority, and a vaccination officer who might also be relieving officer, and who was under the board of guardians; whereas for these four or more part-time officers one or two whole-time men might often be substituted with great advantage to the district. Similarly, the duties of school attendance officer and of school nurse might occasionally be combined in country districts, for a common cause of absence from school was sickness, and in all cases the school attendance officer and the school nurse were valuable aids to success in the work of school and general hygiene when this was properly organized. With the sanitary inspector and the health officer they formed important links in the chain of public health administration. Furthermore, as public hygiene had now taken its place in administrative work, the health visitor was becoming increasingly important. In some districts the health visitor and school attendance officer might advantageously be one and the same person.

Volunteer Health Centres.

In aiming at efficiency the discovery and application of the best means of combining voluntary and official effort was of great importance. There were those who feared the extended rule of bureaucracy, but they did not sufficiently realize that in British self-government, whether central or local, the elected amateur always had the controlling power. This British method, though occasionally irritating to the expert, was, in the speaker's view, a satisfactory compromise. Out of the often tedious conflict of public discussions came real progress, and although it might not be so great as the expert officer might desire, it was less likely to be out of perspective with other branches of work than the expert's original proposals.

No official worker, certainly no medical officer of health, could be said to be doing everything he should for the sanitary and social improvement of his district unless he took stock of all collateral and non-official efforts having the same end in view, and unless he strained every nerve to secure complete co-ordination, to avoid overlapping and hiatus of effort, and to obtain the regular exchange of information, so as to secure the greatest possible return for the given expenditure of energy.

Nova et Vetera.

GRADUATES AT EDINBURGH A HUNDRED YEARS AGO.

IN 1809, on June 24th, as the *Edinburgh Medical and Surgical Journal*[1] records, "the Senatus Academicus of the University of Edinburgh conferred the degree of Doctor in Medicine upon the following gentlemen, after they had gone through the appointed examinations, and publicly defended their respective inaugural dissertations":

OF SCOTLAND.

John Thomson	*De Dysenteria.*
Thomas Elliot	*De Phthisi Pulmonali.*
David King, Surgeon	*De Typho.*
Henry Walker, Surgeon	*De Apoplexia Traumatica.*
John Sanders Shand, Surgeon ...	*De Hydarthro.*
Samuel Burd	*De Hydrope Anasarca.*
John Lauder, Surgeon, R.N. ...	*De Diarrhoea Mucosa.*
David Hay, Surgeon	*De Colica Pictonum.*
Adam Robertson	*De Scrofula.*
Alexander Ross, A.M.	*De Intemperantia.*
James Stenhouse	*De Hydrocele.*
William Sibbald, Surgeon	*De Capitis Injuriis.*
Walter Graham, Surgeon	*De Dyspepsia.*
Robert Greig, Surgeon	*De Digitali Purpurea.*

FROM ENGLAND.

William Sainsbury	*De Apoplexia Sanguinea.*
B. F. Outram, Surgeon, R.N. ...	*De Febre Continua.*
Thomas Haines Banning, Surgeon	*De Angina Pectoris.*
William Bromet	*De Hydropum Causis.*
Charles Mackenzie	*De Asphyxia.*

FROM IRELAND.

Samuel Allen	*De Rubiola.*
George Gillichan	*De Carcinomate.*
John Holmes	*De Dyspepsia.*
Thomas Carey Osburne	*De Hepate.*
Thomas Callanan	*De Febribus Intermittentibus.*
Richard Dancer	*De Cinchona.*
James Doneghan	*De Haemoptysi.*
Edward Dowling	*De Hydrargyro.*

FROM PORTUGAL.

John Climac dos Reys	*De Febribus Intermittentibus medendis.*

FROM THE WEST INDIES.

J. H. Cutting, Surgeon, Barbadoes	*De Rheumatismo Acuto.*
Joseph Carey, Jamaica	*De Arthritide.*
Jas. T. B. Watt, Jamaica	*De Dysenteria.*
Dan. Wane Huggins, St. Vincent	*De Hepatide.*
Patrick Mackenzie, Grenada ...	*De Animi Vi in Morbis, inducendis et curandis.*
Samuel Woodcock, St. Christ. ...	*De Febre Flava Indiarum Occidentalium.*
J. Daniell, Nevis	*De Podagra Regulari.*

FROM AMERICA.

William Bruce Almon, A.M., Nova Scotia	*De Galvanismo.*
John Watts, A.B., New York ...	*De Morbo Coxario.*
John B. Strachan, Virginia ...	*De Ciborum Assimilatione.*
Robert Bayard, Nova Scotia ...	*De Opii et Venaesectionis effectibus in puerperas.*
William Gibson, Baltimore ...	*De Forma Ossium gentilitia.*

It is a list of forty names in all, and the *Journal* goes on to report a second list of seventeen names of gentlemen who graduated on September 12th. On the next page are the names of eight gentlemen (3 from Scotland, 3 from Ireland, and 2 from England) who received the degree of Doctor in Medicine from the University of Glasgow "within the last twelve months." These lists, uninteresting as they appear at first sight, can on scrutiny be made to yield some food for thought. First, in regard to the graduates themselves, it does not appear that it was a very brilliant year. No doubt there were many good men and

[1] *Edinburgh Medical and Surgical Journal*, vol. v, p. 486, 1809.

true amongst them, and they played their part worthily in the Royal Navy and in private practice at home and abroad; but a somewhat hurried look through the pages of the *Dictionary of National Biography* seems to show that only one of them has found a place in that British Valhalla. This was the gentleman called B. F. Outram, Surgeon R.N., in the list, and he had already distinguished himself in the navy. Sir Benjamin Fonseca Outram, as he afterwards became, was born in Yorkshire in 1774—that memorable year when Louis XV died, as Carlyle graphically tells us, of small-pox, when Massachusetts called a Congress, when Wilkes was allowed to take his seat in Parliament, and when Priestley discovered oxygen. He was the son of Captain William Outram, and was educated as a surgeon at the United Borough Hospitals in London. He entered the Naval Medical Service in 1794, and was made surgeon two years later. He saw active service also, being surgeon on board the *Superb* on July 12th, 1801, when Admiral Saumarez with five ships defeated a Franco-Spanish squadron of six sail, off Cadiz. In 1806, with a view to entering upon civil practice, he went to Edinburgh, and there graduated Doctor of Medicine on June 24th, 1809. The following year he began practice in Hanover Square, London, as a physician, and lived there for more than forty years. In 1841 he became Medical Inspector of Her Majesty's Fleets and Hospitals, and ten years later was nominated a K.C.B. He died in 1856, and was buried at Clifton.

Turning next to the geographical aspect of the list, we note with interest that one graduate was a native of Portugal. That country, as will be remembered, was Britain's ally in 1809, when so many other countries were leagued against her. In January Moore had won his last victory at Corunna, and a few weeks after this graduation ceremony took place Wellesley was to gain the battle of Talavera. The Portuguese medical student was amongst friends in Edinburgh in 1809. Further, it is noteworthy that while 14 of the graduates were Scots, 5 came from England, and no fewer than 8 from Ireland. The West Indies were well represented with 7, 2 coming from Jamaica, and 1 each from the Barbados, St. Vincent, Grenada, St. Christopher, and Nevis. Finally, there were 5 from America, 2 of whom were from Nova Scotia, and 1 each from New York, Baltimore, and Virginia. It is to be observed, and it is perhaps of some significance, that these places are all grouped under the name of America, no distinction being made or recognized between the United States and the British possessions to the north. It is to be noted by the way that the gentleman from Virginia—the State, it will be remembered, from which McDowell, the ovariotomist, had earlier found his way to Edinburgh—writes his name in the way now so often done by our Transatlantic cousins, initialling the second Christian name—namely, "John B. Strachan." Further, considering the somewhat strained relations existing between Great Britain and the United States at that time, it is perhaps remarkable that there should have been any American students studying at Edinburgh at all.

Finally, the titles of the inaugural dissertations which these forty graduates had "publicly defended" throw an interesting sidelight upon the state of medical science. There were two theses on dysentery, two on dyspepsia, two on intermittent fever, two on apoplexy, two on liver disease, four on medicinal substances (cinchona, mercury, digitalis, and opium), and two on therapeutic means (venesection and galvanism). The graduate from Grenada was perhaps the Christian Scientist of his day, for he wrote on the influence of the mind in inducing and curing diseases. Dr. Woodcock of St. Christopher took for his subject yellow fever in the West Indies, and the surgeon from the Barbados dealt with acute rheumatism. Most of the other dissertations took symptoms rather than diseases for consideration—for example, angina pectoris, dropsy, colic, asphyxia, mucous diarrhoea, etc. Dr. William Gibson (Baltimore) took an anthropological subject—the racial forms of the bones. It is possible that this was the William Gibson who in 1818 succeeded Physick in the Chair of Surgery in the University of Pennsylvania, and was the first to tie the common iliac artery. If so, then he and Outram were the two distinguished men of their year, of the Americans and English respectively; but perhaps, like Darwin and Walter Scott, they were not so considered by their contemporaries.

LITERARY NOTES.

A DISTINGUISHED correspondent writes that "'M.D.,' who criticizes the use of 'slow' as a verb, should extend his researches in the dictionaries. The usage is universal (going back to Shakespeare), and for boats and pulse is indispensable." The word is recognized as a verb in the *Encyclopaedic Dictionary*, where it is stated to be used both in the transitive and intransitive. In Shakespeare it occurs in *Romeo and Juliet*, Act iv, Sc. 1, where Paris, after explaining to Friar Laurence why her family desires that he should marry Juliet at once, concludes with the words: "Now do you know the reason of this haste." On this the Friar says, in an aside: "I would I knew not why it should be slowed."

"M.D.'s" criticisms have also brought us a letter from Dr. W. J. Shee, of Duncannon, who objects to the expression "arterio-sclerosis." He says:

> I write with great diffidence, as the term is almost invariably used in the same form in the medical journals and textbooks, and a large amount of literary bravery is necessary when one attacks such a well-fortified position. My view—and I advance it in all humility—is that the term came into general use in this form because of its abbreviation from the term "arterio-capillary sclerosis," but that in the shortening process the adjectival quality of "arterio," which should have been preserved and the word changed into "arterial," was lost. The correct expression is undoubtedly "arterial sclerosis." The simple word "arteriosclerosis" (that is, without a hyphen) may, I dare say, be correctly used, but with the intermediary hyphen the term is an abomination. One might as well write "spinio-sclerosis" or "spinal cordio-sclerosis." Either would be, in the words of Euclid, "absurd."

Dr. Shee is probably right in wishing to delete the hyphen. In the New Sydenham Society's *Lexicon* it is not used. Gould's *Dictionary of Medicine* is not quite consistent, as the hyphen is employed in one place and not in another. Authority for "arterio-capillary sclerosis" may be found, but the term introduced by Gull and Sutton was arterio-capillary fibrosis.

The picture of the American country doctor painted by James Whitcomb Riley in his *Rubáyiát of Doc Sifers* may be compared with Ian Maclaren's "Weelum Maclure" and the real man—Dr. James A. Innes of Dufftown, of whom an account was given in the JOURNAL of July 24th, 1909. Like him, "Doc Sifers" was a local institution:

> He's rid these woods and roads—er *swum* 'em now and then
> And practised in this neighberhood sence hain't no tellin' when
> . . . . . .
> In radius o' fifteen mile'd, all pints o' compass round,
> No man er woman, chick er child, er team, on top o' ground,
> But knows *him*—yes, and got respects and likin' for him too,
> For all his so-to-speak dee-fects o' genius showin' through!

Rough hewn and often absent-minded as he is, he is trusted and beloved by all.

> 'Mongst *all* the women—mild er rough, splendifferous er plain,
> 'Er them *with* sense, er not enough to come in out the rain—
> Jes ever' shape and build and style o' women, fat er slim,
> They all like Doc, and got a smile and pleasant word fer *him!*

Horses, dogs, birds all love him; even bees will not sting him.

> But, gittin' back to *docterin'*—all the sick and in distress,
> And old and pore, and weak and small, and lone and motherless—
> I jess tell *you* I 'preciate the man 'at's got the love
> To "go ye forth and ministrate!" as Scriptur' tells us of.

"Doc" has an all-embracing love of Nature. Barks of trees, vines and moss are an open book to him; he can find his way through the woods at night by the stars; he can tell by "underbresh and plants" how far off water is; he can cook; he can make fishing nets; and in his own way he is a sportsman. He is religious, though he does not feel called upon to "testify":

> Without a-claimin' *any creed*, Doc's rail religious views
> Nobody knows—ner got no *need* o' knowin' whilse he choose
> To be heerd not of man, ner raise no loud, vainglorious prayers
> In crowded marts, er public ways, er—i jucks, *any*wheres!—
> 'Less 'n it *is* away deep down in his own heart, at night,
> Facin' the storm, when all the town's a-sleepin' snug and tight—
> Him splashin' hence from scenes o' pride and sloth and gilded show,
> To some pore sufferer's bedside o' anguish, don't you know!

A childless man, he loves the little ones.

And Childern.—*Childern?* Lawzy-day! Doc *worships* 'em!—You call
Round at his house, and *ast* 'em!—they're a-*swarmin'* there—that's all!—
They're in his *Lib*'ry—in best room—in kitchen—fur and near,—
In office too, and I p'sume, his operatin'-cheer!

His library consists of half a dozen shelves full of books. One whole shelf is set apart for medical works. The rest are given up to history, biography, travels; besides these

And Doc's got all the *novels* out,—by Scoot and Dickison
And Cooper,—And I make no doubt, he's read 'em ever' one!

Asked for his secret of happiness he answers:

"Go he'p the sick, and putt your heart in it,"
And then, "A-talkin' furder 'bout that line o' thought," says he,
"Ef we'll jes do the work cut out and give' to you and me,
We'll lack no joy, ner appetite, ner all we'd ort to eat,
And sleep like childern ever' night—as puore and ca'm and sweet."

Though he has a "scrap o' farmin' land, a garden, an orchard, a stable, a chicken lot, and eighteen hive's o' bees," all of which he loves, his heart is in his professional work:

Doc loves his practice; ner don't, wilful, want to slight,
No call—no matter who—how fur away—er day er night.—
He loves his work—he loves his friends—June, Winter, Fall, and Spring:
His *lovin'*—facts is—never ends; he loves jes *ever*'thing. . . .

'Cept—*keepin' books*. He never sets down no accounts.—He hates,
The worst of all, collectin' debts—the worst, the more he waits.—
I've knowed him, when at last he *had* to dun a man, to end
By makin' him a loan—and mad he had n't more to lend.

He has a wholesome dislike of the "Jabberwock," if we may venture to apply one of Lewis Carroll's verbal inventions in a way which perhaps he did not intend.

Doc says: "I 'spise, when pore and weak and awk'ard talkers fails,
To see it's them with hardest cheek and loudest mouth prevails—
A' all-one-sided quarr'l 'll make me *biassed*, mighty near—
'Cause ginerly the side I take's the one I never hear."

The whole picture is charming as a study of a doctor of a kind that is the salt of our profession, one with the strength of a man, with knowledge ripened by experience and guided by common sense, full of the love of all living things, above all of his fellow-men, and with the heart of a little child.

With perfect faith in God and man a-shinin' in his eyes.

Tobias Smollett was a physician, though probably, owing to his haughty and irritable temper, not a very successful one. He has left portraits of the doctors of his day—from the surgeon's mate in the navy to the physician proud of his book learning and ever eager to overwhelm rivals with quotations from the classics—which will live as long as the English language. He was familiar with the "tricks of the trade," though incapable of practising them. It is in *Ferdinand Count Fathom* that we are initiated into the arts by which notoriety was sought by doctors in the eighteenth century. In his many shifts for a livelihood, Fathom turns to physic without taking the trouble even to buy a degree. He is called to a young lady at Tunbridge Wells in the absence of her regular adviser, who on his return tries to thrust him aside, saying that he is resolved "never to consult any physician who has not taken his degrees at either of the English universities." (Smollett, it may be remembered, was a graduate of Aberdeen). Fathom makes the effective retort that "in the English universities there is no opportunity of studying the art; no, not so much as a lecture given on the subject." He presses the point home by adding that there is not one physician of note in the kingdom who has not derived the greatest part of his instruction from foreigners. To this his antagonist has nothing better to reply than that his education cost him fifteen hundred pounds, which brings upon him the stinging retort, "Never was money laid out to less purpose." The further course of the quarrel, amusing as it is, does not concern us here. We give Smollett's accounts of his hero's endeavours to gain a footing as a doctor in London. Having obtained permission from some of the families with which he had contrived to scrape acquaintance at the Wells to call upon them in London, he resolves to make his first medical appearance in the capital with some *éclat*. For this purpose, says the novelist:

He not only purchased an old chariot, which was new painted for the purpose, but likewise hired a footman, whom he clothed in laced livery, in order to distinguish him from the common run of his brethren.

This equipage, though much more expensive than his finances could bear, he found absolutely necessary to give him a chance for employment; as every shabby retainer to physic, in this capital, had provided himself with a vehicle, which was altogether used by way of a travelling signpost, to draw in customers; so that a walking physician was considered as an obscure pedlar, trudging from street to street, with his pack of knowledge on his shoulders, and selling his remnants of advice by retail. A chariot was not now set up for the convenience of a man sinking under the fatigue of extensive practice, but as a piece of furniture every way as necessary as a large periwig with three tails; and a physician, let his merit, in other respects, be never so conspicuous, can no more expect to become considerable in business, without the assistance of this implement, than he can hope to live without food, or breathe without a windpipe.

The requisite is so well understood that, exclusive of those who profess themselves doctors, every raw surgeon, every idle apothecary who can make interest with some foolhardy coachmaker, may be seen dancing the hays in all places of public resort, and grinning to one another from their respective carriages.

* * * * *

None of these observations escaped the penetrating eye of Fathom, who, before he pretended to seat himself in this machine, had made proper inquiry into all the other methods practised with a view to keep the wheels in motion. In his researches, he found that the great world was wholly engrossed by a few practitioners who had arrived at the summit of reputation, consequently were no longer obliged to cultivate those arts by which they rose; and that the rest of the business was parcelled out into small enclosures occupied by different groups of personages, male and female, who stood in rings, and tossed the ball from one to another, there being in each department two sets, the individuals of which relieved one another occasionally. Every knot was composed of a waiting woman, nurse, apothecary, surgeon, and physician, and sometimes a midwife was admitted into this party; and in this manner the farce was commonly performed:

A fine lady, fatigued with idleness, complains of the vapours, is deprived of her rest, though not so sick as to have recourse to medicine. Her favourite maid, tired of giving her attendance in the night, thinks proper, for the benefit of her own repose, to complain of a violent headache, and recommends to her mistress a nurse of approved tenderness and discretion; at whose house, in all likelihood, the said chambermaid hath oft given the rendezvous to a male friend. The nurse, well-skilled in the mysteries of her occupation, persuades the patient that her malady, far from being slight or chimerical, may proceed to a very dangerous degree of hysterical affection, unless it be nipped in the bud by some very effectual remedy. Then she recounts a surprising cure performed by a certain apothecary, and appeals to the testimony of the waiting-woman, who, being the gossip of his wife, confirms the evidence and corroborates the proposal. The apothecary, being summoned, finds her ladyship in such a delicate situation that he declines prescribing, and advises her to send for a physician without delay. The nomination, of course, falls to him, and, the doctor being called, declares the necessity of immediate venesection, which is accordingly performed by a surgeon of the association.

This is one way of beginning the game. Though the commencement often varies, and sometimes the apothecary, and sometimes the physician, opens the scene; but, be that as it will, they always appear in a string, like a flight of wild geese, and each confederacy maintains a correspondence with one particular undertaker. Fathom, upon these considerations, set up his rest in the first floor of an apothecary in the neighbourhood of Charing Cross, to whom he was introduced by a letter from a friend at Tunbridge, and who, being acquainted with his ability and scheme, promised to let slip no opportunity of serving him; and, indeed, seemed to espouse his interest with great alacrity. He introduced him to some of his patients, on the strength of a gratis visit, sounded forth his praise among all the good women of his acquaintance, and even prevailed upon him to publish advertisements, importing that he would every day, at a certain time and place, give his advice to the poor for nothing, hoping that by means of some lucky cure his fame might be extended and his practice grow into request.

In the meantime his chariot rolled along through all the most frequented streets, during the whole forenoon, and at the usual hour he never failed to make his appearance at the medical coffee house, with all the solemnity of feature and address by which the modern sons of Poean are distinguished; not but that he was often puzzled about the decision of his diurnal route. For the method of driving up one street and down another, without halting, was become such a stale expedient, that the very 'prentices used to stand at the shop doors, and ridicule the vain parade. At length, however, he perused the map of London with great diligence, and having acquired a

distinct idea of its topography, used to alight at the end of long narrow thoroughfares, and paved courts, where the chariot was ordered to wait till his return; and walking with great gravity through the different turnings of these alleys, regain his carriage by another passage, and resume his seat with an air of vast importance. With a view to protract the time of his supposed visits, he would, at one place, turn aside to a wall; at another, cheapen an urinal: at a third corner, read a quack advertisement, or lounge a few minutes in some book-seller's shop; and, lastly, glide into some obscure coffee-house, and treat himself with a dram of usquebaugh.

The other means used to force a trade, such as ordering himself to be called from church, alarming the neighbourhood with knocking at his door at night, receiving sudden messages in places of resort, and inserting his cures by way of news in the daily papers, had been so injudiciously hackneyed by every desperate sculler in physic, that they had lost their effect upon the public, and therefore were excluded from the plan of our adventurer, whose scheme for the present was to exert himself in winning the favour of those sage sybils who keep, as it were, the temple of medicine, and admit the young priest to the service of the altar; but this he considered as a temporary project only, until he should have acquired interest enough to erect an hospital, lock, or infirmary, by the voluntary subscription of his friends, a scheme which had succeeded to a miracle with many of the profession, who raised themselves into notice upon the carcasses of the poor.

Yet even this branch was already overstocked, insomuch that almost every street was furnished with one of these charitable receptacles, which, instead of diminishing the taxes for the maintenance of the poor, encouraged the vulgar to be idle and dissolute, by opening an asylum to them and their families, from the diseases of poverty and intemperance. For it remains to be proved that the parish rates are decreased, and the bills of mortality lessened, the people more numerous, or the streets less infested with beggars, notwithstanding the immense sums yearly granted by individuals for the relief of the indigent.

There is nothing new under the sun, and it will be seen from this description that the simple devices of Sawyer late Nockemorf had been discarded as spoilt by overuse nearly a century before his day. Even hospital abuse was not a new thing, and the opening of "fresh medical institutions" was recognized as a short cut to professional success.

THE VITALITY OF THE TYPHOID BACILLUS.

MAJOR J. C. MORGAN AND CAPTAIN D. HARVEY[1] direct attention to an important difference between the vitality of the typhoid bacillus when grown on artificial culture media and the capacity of the same organism for survival under natural conditions, when excreted from the human body. From many investigations which have been published it would appear that the bacillus is capable of a fairly prolonged existence in soil, clothing, or other contaminated material. Firth and Horrocks, for example, have been able to recover the bacillus from soil after two months and from fabrics such as khaki, drill, and serge for as long as eighty-seven days. But Major Morgan and Captain Harvey, whilst not disputing the accuracy of these observations, point out that most of the experiments were performed with cultures, and that their results may be erroneously interpreted unless it is recognized that culture bacilli are possessed of much greater vitality than bacilli obtained directly from excreta. In illustration of this difference they quote some examples recorded by the Enteric Fever Commission in 1908. A convalescent's urine containing enormous numbers of typhoid bacilli was kept in a glass at room temperature; in seventy-two hours typhoid bacilli could no longer be recovered from it. Infected faeces containing 10,000,000 typhoid bacilli to the gram were spread between pieces of blanket and kept on a dark shelf, with the result that the bacilli were found to have lost their vitality on the sixth day. And from a sample of the same faeces which was emulsified in normal saline solution and kept at room temperature no typhoid bacilli could be recovered after the fourth day.

The authors of the present report then proceed to record their own observations, which were made on bacilli obtained from chronic carriers who had suffered from enteric fever more than six months previously, and, though daily passing the bacillus in their excreta, were in excellent health.

One series of experiments was designed to ascertain the vitality of the bacillus in soil contaminated with infected urine. A "carrier" micturated on a selected area of dry ground when his urine contained 6,000 typhoid bacilli per cubic centimetre. Twenty-four hours later he micturated again on the same spot, and this time his urine gave a count of 26,000 bacilli per cubic centimetre. Six hours after the second pollution 2 grams of the soil were examined, and were found to contain some hundreds of typhoid bacilli. But when a similar test was made twenty-four hours subsequently no typhoid bacilli could be recovered; and all the tests made at later periods gave negative results, although on one occasion, three days after the second pollution of the soil, as much as 50 grams of earth were examined. In experiments where the "carrier" was requested to micturate in the dark corner of a small wooden hut with an earthen floor, no typhoid bacilli could be recovered from the soil after the second day subsequent to contamination. As a check on the experiments conducted in the open air, a box was filled with garden soil, 150 c.cm. of urine containing 50,000 typhoid bacilli per cubic centimetre were poured on to the surface, and the box was then kept in the laboratory with the surface of the soil exposed to daylight, but not to sunlight. Typhoid bacilli were recovered twenty-four hours after contamination, but tests made the following day and afterwards all proved negative.

In the case of another chronic carrier, the authors endeavoured to ascertain how long the faeces remained infective after excretion. Their experiments showed that under the conditions which obtain in a dry-earth closet, and in dry-earth methods of dealing with excreta, the typhoid bacillus can readily be recovered up to the end of a week, and that in the interior of a dried faecal mass it may remain alive for as long as eighteen days. Endeavours to cultivate the bacillus at later periods after excretion proved negative. But their positive results, as they remark, indicate how easily the infection could be conveyed by flies from faecal material left exposed in a latrine pan.

When blankets are soiled with infective faecal material, it appears that the bacillus may sometimes remain alive for much longer periods. In one experiment, it is true, the period of survival was only four days. In this case faeces, obtained from the last-mentioned patient, were thickly smeared between two pieces of blanket which were placed in a Petri dish and kept in a press exposed to daylight, but not to sunlight. But in a second experiment of similar nature the faeces from the same patient yielded typhoid bacilli at every examination up to and including the fortieth day, though not afterwards. In this experiment the sample used was a liquid stool, and portions of blanket fibre were pulled out from the soiled area and used for the culture tests.

Experiments were also made with cotton fabrics soaked in infective urine. When the fabric was exposed to daylight, typhoid bacilli could be recovered up to and including the fourth day after pollution, but not later; and when the same material was kept in the dark bacilli were recoverable for eleven days, but then disappeared.

A few experiments were made for the purpose of testing the vitality of the typhoid bacillus in water. About these the authors remark:

> On only two occasions were we able to recover the *B. typhosus* from water richly infected with the urine of a chronic bacillus carrier. On one of these occasions numerous typhoid colonies were found on a plate prepared from the water shortly after pollution, and on the other a few colonies were found on a plate prepared two hours after pollution. These experiments tend to confirm the already accepted impression that the life of the typhoid bacillus in water is an exceedingly short one.

Still more interesting is the apparent difference between pasteurized and fresh milk as media for the growth of the typhoid bacillus. Two flasks, each containing 50 c.cm. of fresh, unboiled milk were taken; one of these was heated to 80° C. for twenty minutes and then rapidly cooled. To both a few drops of infective urine were added, and the flasks were then incubated. The typhoid bacillus was recovered in practically pure culture from the pasteurized flask; but from the unsterilized flask, though there was almost a pure growth of *B. coli*, no typhoid colonies could be obtained. The authors say:

> This experiment demonstrates the well-known fact that the growth of a delicate organism, such as the *B. typhosus*, is favoured in a medium freed from antagonistic bacteria, and also is inhibited by the free growth of the same, and, incidentally, shows the danger of the subsequent contamination of pasteurized milk by pathogenic organisms.

Major Morgan and Captain Harvey disbelieve in the alleged therapeutic value of urotropine for the treatment of typhoid bacilluria. *Post hoc* is not necessarily *propter hoc*, and they suggest that the many cases in which this drug has been thought to effect a cure are merely instances of the well-known fact that typhoid bacilluria often disappears spontaneously. One of their chronic carriers was

[1] *Journ. of the R.A.M.C.*, June, 1909.

put on 10 grains of urotropine three times a day, but, although he received in all 450 grains, there was not the slightest diminution in the numbers of typhoid bacilli excreted in the urine. They considered it unwise to push the drug in larger doses owing to the danger of haematuria.

MEDICAL AND SURGICAL APPLIANCES.

The Loop Developer.

THIS machine, manufactured by Jonas Woodhead and Sons, Leeds, consists of a flat steel spring, bent into the form of five-sixths of a circle of about 9 in. diameter. A force of 50 lb. is required to close the circle, when applied to the two handles, which are fixed to the ends of the spring. A graduated plate and sliding indicator show how much force has been exerted in each effort. The vendors claim that this appliance is superior to the ordinary "chest expander," of which it is obviously the converse. In the former the user has to exert force in order to separate his hands from one another, or one of them from a fixed point; with the loop developer, force has always to be applied to bring the hands nearer together. In all the exercises which can be done with it the greater part of the work must be done by the two pectoral muscles, the muscles of the arms and shoulders taking only a very minor part in them, and those of the back, head, neck, and lower limbs being scarcely called into action at all. The usefulness of the appliance is therefore, in our opinion, likely to be rather limited, but it might be profitably employed in conjunction with the extension exercisers to develop those muscles which these latter are likely to spare. The apparatus would be improved by the substitution of larger wood-covered handles for the thin metal ones, which are apt to twist in the grasp. The prospectus states that weaker and stronger springs than the one which we have examined are also made.

Portable Urine Test Case.

Dr. A. OGIER WARD (London, E.C.) writes: Most men are occasionally compelled to test urine away from home, and it is then that a pocket test case, which has been lying by for some time—months, it may be—is usually found to be disorganized. Ferrocyanic tablets crumble; citric acid tablets deliquesce; compressed tablets of Fehling's solution decompose quite quickly, and, with acids in the liquid form, leakages are very prone to occur, to the detriment of the case. He has therefore designed a pocket case, not open to these objections, which he describes as follows: The spirit lamp supplied will not leak, for it has a thoroughly tight screw cap. The test media are tablets, which will keep almost indefinitely. The test for sugar is free from all reservations, and is applicable when the salicylates are being administered, nothing but glucose giving the indigo reaction. In testing for albumen with salicyl-sulphonic tablets the reaction, if it occur, indicates a proteid of some sort, which implies a pathological condition; it is practically an instantaneous test, and both it and the sugar test are extremely delicate. The case contains a urinometer, two test tubes, litmus paper, spirit lamp, test tube holder, pipette, tubes of tablets, and a card with complete directions; extra tubes, pipettes, and tablets can be procured at any time for a few pence. The complete case costs 10s. 6d., and measures 4 in. by 3 in. by 1 in. It has been put together at his suggestion by Messrs. Allen and Hanburys.

AN official bulletin issued by the Treasury Department of the United States shows that a proposal made last spring for the organization of a coloured Anti-Tuberculosis League is making good progress. This plan contemplates the organization of a State league in each of the United States with a branch in every coloured church. A special feature is the issue of a certificate, a large parchment containing printed information relative to the cause, prevention and cure of tuberculosis, and other information for the prevention of disease. Five State leagues have already been organized, and great interest is being manifested in the movement by persons of negro blood. The plan has been endorsed at a conference of State and Territorial Boards of Health, which passed a resolution to the effect that it was the best scheme suggested for dealing with tuberculosis among the coloured community and that it should receive the support of all Boards of Health. Tuberculosis is predominant among the coloured residents in the United States and is deemed to threaten not only their own race, but to constitute a serious menace to the white people with whom they come in contact.

Medical News.

DR. ARGYLL ROBERTSON left estate valued at £30,000, and the net personalty of the late Dr. Rayner W. Batten, of Gloucester, was £46,000.

THE old students' dinner of St. Thomas's Hospital will be held at the Hotel Cecil, London, on Friday, October 1st, with Mr. J. B. Lawford in the chair.

AT Hastings, on August 17th, a milkseller, against whom two previous convictions were recorded, was sentenced to two months' hard labour, without the option of a fine, for selling adulterated milk.

A RAILWAY traveller has written to the Dublin papers to call attention to the ineffective cleansing of third class railway carriages. The law, he says, compels the disinfection of cattle wagons, and "one would imagine that the life of a man counted for more than that of a beast."

THE King conferred the Royal Victorian Order, Fourth Class, on Fleet Surgeon C. J. Mansfield, M.D., on board the Royal Yacht *Victoria and Albert*, on August 5th, at Cowes. Dr. Mansfield was Fleet Surgeon of R.N. College, Osborne, during the time that H.R.H. Prince Edward of Wales was a cadet there.

ACCORDING to a statement in the *Daily Telegraph*, the Japanese Minister for Home Affairs has issued an order, under the authority of a law recently passed by the Japanese Parliament, forbidding physicians, surgeons, dentists, and all those who conduct hospitals or other institutions for medical consultations and treatment, to advertise anything except their names, qualifications, addresses, and charges.

AT an inquest in Holborn on August 13th, the jury returned a verdict of death from misadventure in the case of a child stated by the medical witness to have died from delayed chloroform poisoning. The child underwent an operation under chloroform on July 10th, and made what was apparently a normal recovery. On the following afternoon, however, symptoms set in which suggested delayed chloroform poisoning. Death took place the same night, and the view formed before death was confirmed on autopsy.

AT the Cheltenham Liberal Club, on August 11th, Dr. Richard Davies was the recipient of an illuminated address and a motor car. For many years past he has played a very active part in the public affairs of Cheltenham, and for some ten years has held a seat on the Town Council. The subscribers to the presentation were upwards of five hundred of his constituents and fellow townsmen, who desired in this way to express their gratitude to Dr. Davies for his services to the town, their continued confidence in him, and their sympathy in respect of some legal troubles in which Dr. Davies was involved by an incident during the elections last autumn.

IT would appear from an article in *Le Progrès medical* that the numerous medical men who do their work in connexion with the Assistance Publique of Paris are about to lose one of the small advantages they gain thereby. Being all either occupants of positions on the staffs of various hospitals, or on the lists of those ready to answer urgent calls from public officials to attend cases of injury or sudden illness in the streets or elsewhere, the Post Office authorities have hitherto deemed it just to remit in their favour 25 per cent. of the ordinary telephonic charges. They have now, however, received notice that from October 1st they will have to pay full rates.

ACCORDING to statistics recently issued by the United States Bureau of Education there are altogether in the United States 2,298 libraries which possess upwards of 5,000 volumes. Thirty-two of them are of a medical character, the largest being the library at the Surgeon-General's Office, which contains 162,000 volumes. Next comes that of the New York Academy of Medicine, which has 85,000 volumes; and, third, the library of the Medical Society of Brooklyn, with 65,000 volumes. Medical libraries containing upwards of 5,000 volumes are distributed as follows: The State of New York is credited with 7; Pennsylvania and Massachusetts with 5 each; Illinois, Ohio, and Maryland 3 each; Missouri with 2; and Rhode Island, Louisiana, Texas, and California with 1 apiece.

British Medical Journal.

SATURDAY, AUGUST 21st, 1909.

THE POOR LAW REPORT AND THE SANITARY SERVICE.

We cannot help feeling that in his Presidential address to the Birmingham Branch, on the reports of the Poor Law Commission, Dr. Manley has unwittingly fostered the idea, which he himself would probably regret, that there is some tendency for the sanitary service to find itself in conflict with the interests of general practitioners. There can be no hesitation in saying that any such conflict between two branches of the profession would be suicidal. We are quite convinced that disputes that may have arisen have been practically all personal between individuals, and there is not and never has been any opposition to the sanitary service on the part of either the Association or the Journal, nor has the possible danger of any collision between that service and general practitioners been unnecessarily accentuated.

But even if we regard the interests of medical officers of health apart from those of the profession at large, it is by no means clear that they would be in any way furthered by the adoption of the suggestions of the Minority Report of the Poor Law Commission. On the contrary, there is considerable danger that the sanitary service would become far less attractive if the Minority suggestions were carried out. On the other hand, under Dr. Downes's scheme for a reformed board of guardians, partly elected publicly *ad hoc* and partly consisting of nominated members, it would probably be considered necessary to concentrate under the reformed board all the medical treatment now undertaken by the health committees, including the management of fever hospitals and sanatoriums, and to leave to the health committees only their strictly sanitary duties. Dr. Downes is strongly of opinion that any amalgamation of the sanitary service with medical relief "would be detrimental and contrary to "the public interest." With this reservation, Dr. Downes's scheme would not touch the medical officer of health.

Under the Majority scheme of a single statutory committee of county or county borough councils as the Public Assistance Authority, the authority would act by two committees, one for general and the other for medical relief. The advantages of putting the whole of medical assistance into the hands of one committee are obvious, especially as the authority itself is constituted to co-ordinate the work of its own two committees. Here the position of the medical officer of health would be no worse but rather better than at present. With the object of defining the limits of the work of each committee, and preventing overlapping, members of the Health Committee are to be elected on the Medical Assistance Committee. The medical officer of health would thus be freed from any uncertainty as to what his duties were, and there is nothing in the scheme that would in any way injuriously affect his position.

But when we come to the Minority scheme, we are bound to point out some features which need serious consideration by medical officers of health. In the first place, no less than four separate committees of the councils would be concerned directly and indirectly in dealing with the non-ablebodied—the Education Committee for children of school age, the Health Committee for birth and infancy, treatment of the sick and institutional treatment of the aged, the Pensions Committee for home treatment of the aged, and the Asylums Committee for the feeble-minded. The overlapping that would result between so many committees would be so serious that the Minority Commissioners have thought it necessary to make a special provision, which goes far to vitiate the whole scheme—that is, the appointment of a special paid official, to be called the Registrar of Public Assistance, with almost autocratic powers, quite independent of the four committees, and only responsible to the General Purposes Committee of the Council; while the Finance Committee would have to arbitrate between the registrar and the four relief committees. It would sometimes happen that the members of a single family would be each under a different committee at the same time, and apart from the difficulty of deciding whether a person were ablebodied or not—that is, whether he should be dealt with by the national organization for the ablebodied or by one of the local committees—there would be frequent disputes as to which committee should deal with a particular person. It is accordingly provided that the registrar should decide such disputes between committees. If the Health Committee, for example, after carefully considering a case with the advice of the medical officer of health, should decide to grant home treatment and home aliment, the registrar is to be invested with power absolutely to veto such decision. The Health Committee's remedy would then be either to send the case to an institution—a privilege which it is to retain, though it might think it better treated at home—or to appeal to the Finance Committee to arbitrate between it and the registrar. It is easy to imagine that the Health Committee would bitterly resent having to submit its carefully considered resolutions to a single paid official who had the power to override them, and the position of the medical officer of health would be far from enviable. This is no fanciful picture; it is actually contemplated as happening by the Minority report and is fully described in Part I, Chap. XII, 3, d. We are also told that "mixed" cases occur which the registrar would receive into a "receiving home" provided for him, where they would get any immediate treatment required until the registrar decided which committee must deal with them, and we read, "It "would be obligatory that the registrar's instructions "in this respect should be obeyed; but the committees "concerned would be free to bring the cases before "him at a subsequent sitting and to show cause why "they should be transferred to the care of some other "committee," etc. Could officialism be carried further, and would any Health Committee, acting presumably on medical advice, tamely submit to be dictated to by a non-medical paid official?

But this is not all. There are in England and Wales 74 county boroughs and 62 administrative counties, 26 of which have no county medical officer. Thus, there are now about 110 county and county borough medical officers. At present each one of these is administrative head of his

department. He would possibly, even probably in most cases, remain so under the Minority scheme. But there is no certainty about it. Numerous rivals are to be introduced. The report provides that, in the so-called "unified service," *that* one of all the medical men in the service "should be placed in "administrative control who had developed most administrative capacity," and Mrs. Sidney Webb, in appealing for the support of the Poor Law Medical Officers' Association, drew an alluring picture of district medical officers as possible heads of the service.

Again, there are some hundreds of medical officers of non-county boroughs, urban and rural districts, each one also the head of his department; but under the Minority scheme all of them would become subordinate to the future county medical officer, who might, we are told, be a clinician, not a sanitarian. Further, the report suggests that all boroughs with less than 10,000 population, urban districts with less than 20,000, and all rural districts should be "encouraged" to cede their present health duties to the county and be merged under the county medical officer. To assist in thus "encouraging" them, they are not to receive any share of the future grants-in-aid. But the report strongly advises that rural district councils should be abolished altogether, and even their sanitary and other work given to the county. It is not said what is to become of the present rural medical officers. Simple extinction seems to be their fate, as they have no security of tenure.

It must be evident from the above that, looked at solely from the point of view of the ambitions with which medical officers of health are credited, the result of the Minority scheme would very probably be calamitous. There would be a greatly increased number of competitors for such public health appointments as were not abolished, and amid the host of new rivals competing for the posts, existing assistant medical officers of health would be swamped.

It must not be inferred from these remarks that unqualified approval is given to the rival Majority scheme. The dangers of unlimited contract practice and provident dispensaries are very evident, and the proposals will need careful criticism and investigation though they only remotely affect the medical officer of health. We have said nothing of the effects of the Minority scheme on the public and on general practitioners, and, reserving this for the present, will merely observe that even greater risks to their interests may arise. We thoroughly agree with Dr. Major Greenwood in his letter published this week, when he says that the almost inevitable tendency of the Minority scheme is towards a free medical service to all applicants; or, in other words, it will foster parasitism instead of self-providence.

Sufficient, however, has been said to show that, in urging that the Minority scheme should be most carefully and critically analysed before being accepted, we have not overlooked the interests of medical officers of health, which are as distinctly threatened as those of district medical officers. One fact is beyond dispute, that no one branch of the profession can stand by itself, and unless there be united action through the British Medical Association, which includes not only general practitioners but district medical officers, medical officers of health, and every branch of the profession, the reform of the Poor Laws will bring disaster to the profession, with far too little compensating benefit to the public.

RAY THERAPEUTICS.

Against medicine, as against every other profession, gibes are ever forthcoming, and among the more popular are statements to the effect that its therapeutics are not less ruled by fashion than are other matters mundane, and that in the face of what eventually prove really great advances it is sceptical. To a certain extent these charges are mutually destructive, and in neither of them, when traced to such a basis of truth as they possess, is there anything of of which medicine need feel ashamed. When good evidence of the efficacy of some new line of treatment is forthcoming it is natural and creditable that medical men should be anxious to adopt it promptly and widely for the benefit of their patients, and it is equally creditable that they should be unwilling to pay homage to gods of unproved divinity—to believe forthwith that by their untested power mountains hitherto impassable can readily be traversed.

Instances in point formed indirectly the main subject of consideration at the two discussions of the Section of Dermatology at Belfast of which an account is published in this issue. When radium first came upon the scene seven or eight years ago, some medical men were ready to claim that a therapeutic millennium had arrived; but the majority asked for proofs. Their scepticism proved justified, for little by little it became clear that for the moment, at any rate, radium therapeutically considered could do little as compared with x rays, and did that little dangerously. Steady investigations of its properties, physical and therapeutic, were, however, conducted on scientific lines, so that real progress has been made, and during the past year or two hopes have revived. The present position of matters was fully set forth in the discussion at Belfast, and it is clear that a sound basis for therapeutic utilization of radium has at length been laid; there is now sufficient evidence to prove that in some conditions this powerful element presents therapeutic advantages greater than those possessed by x rays, and that as time goes on very material benefits from its extended use may reasonably be expected. Methods have been devised by which it is claimed that precise dosage can be secured, and the rays be made to act at any particular point and depth desired. In other words, the radium-therapist can gauge the force of his weapon with precision, and can hit a distant mark, leaving intermediate objects untouched.

In the estimation of dosage the radiation strength of uranium is taken as the unit, and that of pure radium as two millions, intermediate strengths depending upon the amount of bromide employed in the preparation of the radium for use. Of equal importance in dosage is the duration of application, since any salt of radium, however weak, may destroy, not merely modify, tissues, if applied sufficiently long, and this may not always be desirable.

The quality or carrying power of the charge to be used must also be determined, for on this depends the success of the oprator in bringing his weapon to bear at the right distance. He must be able, according to the nature of the case under treatment, to act at will either on the surface alone or on the tissues immediately beneath the skin, or on growths lying at considerable depths. This is effected by taking advantage of the fact that the emanations are made up of rays of at least five kinds—alpha rays, soft, medium, and hard beta rays, and gamma rays—which all differ in

power of penetration. Hence the rays are filtered, so to speak, by the interposition between the applicator and the body surface of leaden screens of different thicknesses according to the effect desired.

A further advance is of a mechanical nature; the modern method of employing radium is to spread whatever quantity of it is used evenly over the surface of the applicator, attaching it by varnish. An amount which, when bulked together in a glass tube, would affect merely a very limited surface is thus made to act on a large extent of tissue. This is a great advantage, because not only does it make the treatment of any individual case more rapid, but by enabling more work to be got out of a given quantity of radium it makes the sparsity of the total amount of this element at present isolated less detrimental to the progress and extension of radium therapeutics. In the same connexion may be mentioned the device which its inventor has called the "cross-fire" application of radium, or the bringing of a tissue or a growth under the influence of radium from opposite directions simultaneously.

Radium therapeutics are, of course, still in their infancy; but decided progress has been made, and the whole subject of radium therapy is in a very different position from what it was some three or four years ago. A great deal of the credit for this advance is due to Dr. Louis Wickham, of Paris, who was the principal speaker on this subject at Belfast, and who on the same occasion recorded a number of excellent results obtained by him in dealing with abnormal tissues and growths hitherto little amenable to treatment. It is true that he has been fortunate in having at his command much greater quantities of radium than any one else, but it is owing solely to his personal merits as a scientific investigator that his opportunities have been turned to such excellent use. Furthermore, radium therapy is to be congratulated on having in Dr. Wickham not only an earnest student, but a modest exponent of its merits in relation to analogous lines of work. When asked, for instance, as to its utility in ringworm, he replied that he had not tried it, because the results obtained by x rays in this disease were so splendid, and he spoke of lupus and Finsen light in much the same way. This makes it clear that as the chief exponent of this new science, he sees no present antagonism between it and other forms of ray treatment, and the probability is that none will arise. If further experiments prove the right of radium therapy to a permanent and important place in therapeutics, it will no doubt before long become easy to distinguish cases best treated by Roentgen rays, Finsen light, and those for which radium should be reserved. Meantime, it is to be remembered that Roentgen ray work is itself but a half-fledged science, and much may result from the introduction into it of the principle of filtration, with which experiments have already been conducted by several investigators in this country.

The other subjects on which very interesting discussions were held in the Section of Dermatology were the x-ray treatment of tinea tonsurans, and the question of the existence of special susceptibility to x-ray light. Sabouraud's successful use of x rays in the treatment of ringworm in France was adopted so rapidly and widely in other countries as to evoke in some quarters the foolish gibe to which allusion has already been made—namely, that the x-ray therapists were guided by fashion, not by science; and in England the same special department of medicine incurred considerable obloquy owing to a somewhat misguided proposal to make this form of treatment obligatory in respect of elementary school children. The ground of attack was not that the treatment was ineffective, but that it was dangerous, since on the analogy of some experiments conducted with animals abroad arrest of the mental development of the children thus treated might, it was feared, occur. On turning to the report of the proceedings, it will be found that this aspect of the question was well threshed out. Some members took the view that, in order to be on the safe side, children under 3 years old, whose brains are not yet thoroughly protected by an osseous covering, should not be submitted to epilation by x rays; but all agreed that, in regard to others, the treatment was free from risk of injury to the brain and brilliant in its results. The conclusion was based not only on theoretical grounds, but on the very large amount of practical experience which has accumulated, and it is the more convincing because not all present were prepared to admit that x-ray treatment should invariably be substituted for treatment by drug applications. On the other hand, while it was freely admitted that in the past a certain number of cases of dermatitis and permanent baldness in patches had occurred, it seems to have been agreed that these were generally, if not always, due to lack of adequate experience, and that in future that beautiful word "idiosyncrasy" can rarely be accepted as an excuse for the occurrence of untoward results in x-ray work of any kind. On this point the view at present held among Roentgen-ray experts would seem to be that nothing which can truly be called x-ray idiosyncrasy exists. Though the precise effects of an exposure differ in every individual, the limits of variation are too small to account, as a rule, for what would be a proper dose in one person producing a harmful result in another.

AN EFFICIENT AMBULANCE SERVICE FOR LONDON.

THE long-discussed question of the provision of an adequate ambulance service for cases of accident and illness in streets and public places in London appears to have suddenly entered upon an acute stage during the hot wave, and has engaged the active attention of the House of Commons. Last April Sir William Collins introduced a bill virtually reproducing in a single clause the powers sought by the London County Council in 1906 to enable that authority to establish and maintain a rapid ambulance service in London, summonable by telephone calls. These powers passed the Commons without any opposition, after full inquiry by the Police and Sanitary Committee, but were thrown out in the Lords at the instance of a Committee presided over by Lord Camperdown. The Home Office at that time considered that a conference between the Police, the Home Office, and the County Council might be the means of improving upon the County Council's proposals, which were criticized by the Lords on the grounds of finance. Ultimately a Departmental Committee was set up, consisting of three members—Sir Kenelm Digby (Chairman), Lord Stamford, and Sir William Collins. This Committee, which reported in February last, was unanimous in condemning the *status quo* in London (outside the City); it found that no use was made of the telephone to summon the ambulance, that wheeled litters were the conveyance in favour with the police, but that cabs and ordinary vehicles were used in some 60 per cent. of the cases conveyed to hospitals. The result, the Committee

said, was not infrequently detrimental to the persons thus conveyed, and in something like a third of the graver cases definite fault was found with the mode of conveyance employed. The Committee was unanimous also in approving the magnificent object lesson given to London by the City, which, possessing control of its own police, had, after opposing the County Council's bill, wisely adopted a scheme on the same lines. By means of the City electric ambulance, summoned by telephone, street accidents are now dealt with and in hospital in nine minutes, on an average, instead of eighteen as formerly. Moreover, the experience gained with the ambulance stationed at St. Bartholomew's Hospital has induced the City to commission a second to work in connexion with the London Hospital.

The Departmental Committee was unfortunately divided in opinion as to the authority which should be entrusted with ambulance duties in the County of London—two of its members favoured the Metropolitan Asylums Board while one recommended the London County Council.

The Asylums Board had in 1903 passed a resolution excluding the dealing with street accidents from the contemplated extension of its service, since at that time the County Council was anxious to undertake such duty. Since the Moderate Party came into power at Spring Gardens, the Council would seem to prefer, mainly on grounds of economy, that the Asylums Board should add street accident work to that of its infectious ambulance service—and has generally approved of the recommendations of the Home Office Committee. Mr. W. Peel, the leader of the Moderate Party in the Council, accordingly introduced a bill into the House of Commons last week to carry out this policy. Meanwhile the bill of Sir William Collins had secured a second reading and been referred to a Standing Committee. On Tuesday this committee passed the bill of Sir William Collins, and by 28 to 1 approved of the London County Council as the future ambulance authority for London.

We deplore this squabbling over the relatively subordinate question of the body to carry out the work while street accidents are increasing by thousands in London, and now exceed 14,000 a year. A vast amount of totally unnecessary and easily preventable suffering is occasioned by the present lack of an efficient service, as the report of the Home Office discloses in its valuable appendix, based on information derived from London hospitals. London is seriously in default in this matter in comparison with other large towns. The Home Secretary, in his speech before the Standing Committee, urged the need of prompt and decisive action, and while duly weighing the *pros* and *cons* decided definitely for the County Council as the authority to be entrusted with this municipal duty. It is not surprising that he should have come to this decision. Since the Home Office Committee reported, the Report of the Royal Commission on the Poor Law has threatened the existence of the Metropolitan Asylums Board. Great and beneficent as the work of that body has been in dealing with infectious disease, it would be unwise in view of its uncertain future and anomalous composition, to entrust it with these additional duties, involving new rating powers. We are also disinclined to urge, even on grounds of economy, that it is desirable to set up a non-infectious ambulance organization in close relation with an infectious service. By strict precaution, risks may be reduced, but they cannot be so effectively safeguarded as by relegating the two duties to entirely separate departments. Whatever real risk there may be, the public are not likely to minimize it, and it would be unfortunate to prejudice the new service by any such possible but avoidable occasion for unpopularity. Mr. Gladstone's decision is, therefore, welcome, and it is to be hoped that it means that prompt effect will be given to his views, and a satisfactory legislative solution speedily found for this needlessly and harmfully prolonged controversy.

INVASION.

The idea of invasion, long foreign to the minds of the inhabitants of these islands, is becoming as familiar to us at the beginning of the twentieth century as it was to our forefathers at the beginning of the nineteenth, and the result of the appeal which the Secretary of State for War has made this week cannot be doubtful. The people of the country, men and women alike, are asked to fill up a gap in the organization for dealing with sick and wounded in case of invasion. The medical service of the Territorial Force actually engaged in the field—for the fighting units—has been planned out, and, though much remains to be done, a good beginning has everywhere been made, while in not a few districts the cadres are full. The general hospitals, to which the sick and wounded will be removed, have been organized to the number of twenty-three in the chief centres of the country—that is to say, the staffs have been appointed, for the military conception of a hospital is a staff and not a building; the task of selecting buildings which can be adapted to the purpose has been begun, but is still far from complete. Between these two extremes, however—between the fighting force where the man is struck down by bullet or disease, and the general hospital where he is to be nursed back to health—is the gap to be filled in by this new system of voluntary aid detachments, organized on a county basis by the county associations of the Territorial Force with the assistance of the British Red Cross Society and the St. John Ambulance Association. A certain amount of imagination is required to picture the state of things which would come about in this country so soon as an invasion became effective. It is not difficult to imagine the immediate results of an action, the wounded who demand first aid and rapid transit to some place where they can enjoy all the advantages of surgical skill. It is less easy but not difficult to realize that within twenty-four hours of a territorial division being on foot to oppose the enemy a large number of sick would require treatment, and that within a week their numbers would probably amount to at least 10 per cent. of the force. It is easy also to picture the reception of these sick and wounded into the specially organized military general hospitals; but it requires a greater effort of imagination to realize the scenes which would attend the transport of the sick and wounded from the field ambulances, to which they would be at first conveyed, to the general hospitals. The scheme now put forward proposes the organization in time of peace of Voluntary Aid Detachments in every town, and indeed in every village, of the country, trained to make use of improvised material, to make country carts and vehicles possible for the transport of wounded, to establish rest houses pending their transmission by rail to the general hospital; the magnitude of the service required fully justifies the general appeal now made. The Territorial Force being organized on a county system, with associations in

each county responsible for its efficiency, it is natural to place this new service upon the same basis, and already the British Red Cross Society has organized county committees in England, Wales, Scotland, and in some parts of Ireland, which will be able at once to give valuable assistance. The reason why Scotland is not dealt with in the scheme issued this week would appear to be that that country has, not for the first time, stolen a march on her sisters, and has already gone so far forward in the task of filling up the gap, that only a few planks are needed to bridge it. However this may be, it is certain that in Scotland, as in England and Wales, no scheme can be successful unless the hearty co-operation of the women of the country can be secured. Their assistance will be required not only to stimulate the mere male to realize what would come about if the country were invaded, but their personal services are needed also as nurses, as cooks, and in many other capacities in which a woman who understands housekeeping and men is supreme.

BUSINESS IN THE HOUSE OF COMMONS.

THE course of business in Parliament is gradually shaping itself for the closing of the session. On Monday the Lords adjourned till August 30th, when they will come back to consider some smaller bills which by that time may be ready for them before the Irish Land Bill and the Budget engage their attention. In the Commons the Finance Bill, with its land clauses, will occupy several more days. The Irish Land Bill will be taken after the land clauses are finished, and the Finance Bill resumed with the licensing clauses early in September. On these and the remaining clauses of the Budget proposals there is likely to be more rapid progress, and in many quarters it is expected that the session will close early in October. The Housing Bill has not been referred to in discussing the course of business, but it will certainly be taken whenever the opportunity may arise. If it cannot be taken before September 2nd it may very possibly not get its chance till the Budget is being discussed in the Upper Chamber. This bill will require some days for its Committee stage, inasmuch as there are thirty-seven pages of amendments on the paper. The valuation proposals of the Budget will greatly facilitate the passage of the Housing Bill, and equally help its working when passed. One of the most contentious points to be discussed is Clause 30, which has four pages of amendments to itself. From a public health point of view this clause with its quinquennial census of houses, is absolutely necessary to make the bill work effectively, and the only alternative to this clause—the proposal to give security of tenure to medical officers of health, as proposed in Sir Walter Foster's Bill—does not, so far, find favour with the Local Government Board. An endeavour will be made by an instruction to extend the scope of the Housing Bill so as to include district and borough medical officers and give them the same security and position as county medical officers, but there cannot be much hope of carrying such an instruction in opposition to the Government.

PRESCRIBER AND DISPENSER.

THE relations of prescriber and dispenser have long been difficult, ambiguous, and often unsatisfactory, but only because circumstances keep thrusting the functions of the one upon the other. If the members of the medical profession were polled we have little doubt that a large majority would be in favour of release from the troublesome burden, and the inevitable commercialism of dispensing, on any terms that would leave them a reasonable living from the exercise of their purely professional activities. On the other hand, we think it likely that the better class of pharmaceutical chemists would be glad to be saved from the false position of "counter prescribers" if they were relieved from the competition of doctors who dispense. In these circumstances, a paper entitled "What Shall I Do? A Dispenser's Dilemma," read some time ago before a meeting of the Pharmaceutical Society by Mr. Donald McEwan, is interesting. No reasonable medical man will regard Mr. McEwan's paper as an arraignment of his profession, although it cites cases in which it was alleged that medical men had committed errors in prescribing in the first instance and had afterwards received the courteous representations of the dispenser in a wrong, sometimes even in a discourteous, spirit. As Mr. McEwan says, the relations of prescriber and dispenser should be those of "courtesy and respect." But his title is a query, and, in a sense, the whole of his paper is a query, and one of the questions in his mind is apparently this: How is the responsibility to be apportioned in the case of a disaster happening through the compounding of a prescription by a chemist, which contains an apparently dangerous dose of any drug? We have no hesitation in saying that the chemist is doing his duty in calling the attention of the prescriber to the unusual nature of the prescription; and this course is, we believe, very usually followed by responsible pharmacists. Mr. McEwan's further suggestion, that an apparently dangerous dose in a prescription should be initialled by the prescriber and the prescription retained by the dispenser, is reasonable, and has often been made before; for the results the prescriber must be solely responsible, provided the dispenser can prove that he carried out his instructions. It is not only common sense, but it is the law that the prescriber should be responsible for his prescription and the chemist for its compounding. But these are questions which comparatively seldom arise. Practically, the medical men who attain to a purely prescribing practice, whatever their importance intellectually and socially, are in a numerical minority. But there are medical men who not only dispense mixtures, but derive a profit from the sale of syringes and trusses, *et hoc genus omne*. May not the dispensing chemist ask: "Why not sell toothbrushes, "as I do? Why object to your surgery being called a "shop, any more than my place of business?" The obvious fact is that a section of the public still believes that "the bottle" is the essential thing in therapeutics. Young men enter into practice, and soon find themselves helpless against this prejudice. They do what they can for their patients as professional men with a scientific training, but too often the only basis on which they dare to estimate their fees is the number of "bottles" supplied. The whole system is indefensible. It is derogatory to the medical men who are compelled to adopt it, and the pharmaceutical chemists, with whom we ought to be in a position to work hand in hand, consider that it is commercially injurious to them. The remedy is to be found only in combination, and assertion of their professional status by the members of the medical profession as a whole, and in the education of the masses, who have already been taught by the legal profession that expert advice without any material symbol is worth paying for.

A BLAMELESS BONESETTER.

A STRANGE example of the perversity by which coroners' juries, the members of which no doubt merely reflect the opinion of the class from which

they are drawn, are sometimes afflicted, was afforded by an inquest held at Crickhowell, Breconshire, last week. A young farm labourer was knocked down by a runaway horse and sustained a compound fracture of the thigh. Dr. A. E. Jones was sent for, but his attendance was almost immediately countermanded, and it was not until about forty-eight hours later that he saw the patient, who was then evidently dying. In the interval the man had been attended by a bonesetter, who applied some sort of splint and bandaged the limb. Dr. Jones found the limb greatly swollen and the bandages very tight; on cutting them off, discharges escaped accompanied by a hissing noise, so that it seems probable that the wound had become infected by one of the gas-forming bacteria. Dr. Jones attributed death to acute septic poisoning following the compound fracture, shock, and collapse. The bonesetter stated in evidence that he had said that he feared blood poisoning would occur, but, so far as appears from the reports before us, he took no steps to prevent it. The jury returned a verdict in accordance with the medical evidence, but added a rider to the effect that no blame attached to the bonesetter. This is an odd rider to be returned in the twentieth century, some forty years after the institution of compulsory education. The Welsh are not naturally a slow-witted people, and one would have supposed that by this time some knowledge of the fact that septic poisoning in compound fracture can and ought to be prevented would have filtered through even into the sequestered but beautiful valley where this tragedy occurred. Possibly it may be an instance of what theologians call invincible ignorance, but, even if we adopt that charitable view, the moral seems to be that the time has come when the elementary truths of physiology and hygiene should be taught in the elementary schools, so that the next generation at least may not follow false shepherds. Perhaps some patriotic Welsh doctor will set about the preparation of a primer in the native tongue which the educational authorities of the principality may be induced to adopt.

THE EARLY TREATMENT OF INSANITY.

The Commissioners in Lunacy in their sixty-third annual report draw the attention of the Lord Chancellor to Dr. Henry Maudsley's munificent offer to provide a sum of £30,000 for the foundation in London of a hospital for the treatment and study of mental disease. They remind the Lord Chancellor that in previous reports they have indicated the great importance of early and individualized treatment of insanity, and have constantly pressed for the provision of institutions such as that which Dr. Maudsley now proposes to create. His offer, therefore, and the scheme of working by which it was accompanied, seem to them equally admirable, for together they represent a serious and comprehensive attempt to afford additional facilities for the study of mental diseases in their more acute forms, and to subject to skilled treatment at the earliest possible moment cases of incipient insanity. Many of these it should be possible to arrest if dealt with sufficiently early. They see, however, that two difficulties will have to be faced if such an institution as that which Dr. Maudsley proposes to bring into existence is to be put in a position to fulfil its purpose adequately. One is the question of site, which should be easily got over; the other, that of certification. To deal with the latter a modification in the English law respecting insane persons is required, and should not prove impossible to obtain. Legislation of the kind desired has already been initiated both in the House of Lords (in 1899 and 1900) and in the House of Commons (in 1904 and 1905), but abandoned for lack of time. The bills introduced enacted that if a medical man certified that a person was suffering from unconfirmed mental disease, and that it was expedient with a view to his recovery that he should be placed under the care of a person named in the certificate for a period specified (which could not exceed six months) then during that period Section 315 of the Lunacy Act, 1890, would not apply, though the Commissioners would be notified of the giving of such certificate and of the reception of such patient and be at liberty to visit and examine him if they thought fit. The Commissioners can see no valid reason why this principle and practice should not be made applicable to the proposed hospital, and they think that the time has arrived when there might be, in the early stage of acute mental disorders, some such relaxation as has been indicated of the properly stringent regulations in confirmed cases which safeguard the liberty of the subject and endeavour to insure the kind and proper treatment of the patient. If such relaxations of the present law were allowed, the need of the judicial order and two formal medical certificates involved by Section 315 of the Lunacy Act would in many cases never arise, since recovery would ensue before the lapse of time should have rendered them necessary. In that case the patient would be free from what is unquestionably, even if unreasonably, regarded as a stigma—namely, formal certification as a lunatic. A law of the kind in question has existed in Scotland for many years past, and there is no evidence, the Commissioners find, that anything but good has resulted from it. They are, therefore, as ready as at the time the bills mentioned were introduced to recommend the extension of the principle to England and Wales, and that it should be made applicable to institutions such as Dr. Maudsley's contemplated hospital, which, without such modification in the existing law, would not be able, they think, to fulfil its purpose. The ordinary contents of the Commissioners' report will be dealt with in a later issue.

RADIOGRAPHY AND PERI-URETERAL PHLEBOLITHS

We mentioned in the Journal of July 24th Proust and Infroit's case where right pyonephrosis and calculus in the ureter were diagnosed. By the aid of radiography a shadow was detected corresponding to the course of the right ureter, a little above its termination in the bladder. The patient died after nephrotomy, and it was then discovered, after repeated radiography and careful dissection, that the shadow, really double, indicated not a calculus but two small phleboliths in a vein in a sheath of the ureter. We mentioned Dr. Mackenzie Davidson's caution to surgeons about deceptive appearances, and we think it fair to add that Dr. G. Harrison Orton dwelt on the same subject in his interesting paper on the use of the *x* rays for the detection of renal and ureteral calculi, read at a meeting of the Electro-Therapeutical Section of the Royal Society of Medicine in November, 1907.[1] He referred to a case in Sydney, where an operation for ureteral calculus was performed on the strength of *x*-ray evidence, but the shadows were found to be due to "shotty" bodies outside the ureter. Dr. Orton observes that the shadowgraph bougie would probably have settled the question in this case, and that as the shadows were very small a course of expectant treatment with careful watching of symptoms would have

[1] The *X*-Ray Diagnosis of Renal and Ureteral Calculi. *Proc. Royal Soc. Med.*, vol. i, part i.

given valuable information. Orton exhibited a negative showing shadows which he believed might be due to phleboliths, though they might indicate a calcified gland. On the other hand, there were two shadows, side by side, which did not look like stones in the ureter, and there were no symptoms pointing to renal or urachal trouble. The patient was perfectly well, excepting that she suffered from persistent oedema of the lower extremities. She was *x*-rayed with a view to determining whether anything could be found which might be exerting pressure on the common iliac veins, as she was rather too stout for examination by other means. Dr. Orton's case shows what difficulties may attend the diagnosis of diseases of the urinary tract by the aid of radiography, particularly in fat patients.

THE TRACHOMA QUESTION.

UNDER the heading "Trachoma and Emigration" A. Beauvois contributes to the *Recueil d'Ophtalmologie* for May, 1909, an article dealing with the increase in the number of trachoma cases coming to the Paris ophthalmological clinics, an increase due almost entirely to cases which have immigrated from Palestine, Syria, Roumania, and Russia. The majority of these individuals have arrived in Paris *en route* for the United States or Canada, but have been unable to get a passage owing to the stringent examination enforced by the large steamship companies. The article is one of very great interest, because every word of it applies not only to the conditions in France, but in even greater degree to those prevailing in England to-day. Fifteen years ago trachoma was quite an infrequent disease in London, and is now almost unknown in many of the smaller provincial towns. But at the present time at our largest ophthalmic hospitals a junior house-surgeon spends a great portion of his time in treating granular lids, and on Saturday morning a considerable proportion of the patients are aliens afflicted with trachoma and its sequelae. Beauvois points out the terrible ravages of trachoma in Italy, in Russia, in Spain, and in Ireland, and contrasts these countries with France, where trachoma is infrequent. He then tells us how the United States, Canada, Mexico, and the South American States have enacted most stringent laws to exclude trachomatous aliens; so severe, indeed, are these measures that even an individual whose lids are scarred by healed trachoma is not admitted. The result is that the diseased are weeded out, first at the home ports, and then in America, and in most cases remain in France—and, we may add, in England—being herded together in the most squalid conditions, waiting for the cure which never comes, to enable them to join their compatriots in America. The result is a terrible danger of the diffusion of the infection at home. Beauvois has so far been unable to convince himself that at present trachoma is spreading from the alien to the indigenous race. He believes there is a special race proclivity, and that some nations are partially immune. Trachoma is a disease of poverty and squalor, and is most prevalent among the Jews, the Russians, and the Syrians and Egyptians. There is very probably some truth in this view; but unfortunately there are many exceptions. Europeans who go to live in Egypt and in Palestine occasionally contract trachoma of a severe type, and there is no doubt whatever that trachoma among the London children is far more common than it was twenty years ago, and yet their general health has improved and hygienic conditions are far better. The cause is quite obvious. The Aliens Immigration Act, never severe as regards trachoma, is now practically a dead letter. A flood of trachomatous aliens reach our shores, and many settle in our larger towns. The results of our policy make themselves evident in every large ophthalmic hospital in the country.

THE CORONER'S JURISDICTION.

AN instance of the curious extent of the jurisdiction of the ancient office of coroner was afforded by an inquiry held this week at Yeovil. The proceedings, which took place under an Act of Henry III, were to determine what a certain gold ornament found was, and by whom it was found; the jury solemnly decided that the article was an ancient British torque, that it was found by Henry Coles, and that the owner was unknown. Coles described how he found it surrounded by clay, and sold it to the Somerset Archaeological Society for £40, and half its additional value, if any. The Curator of the Somerset County Museum said that the torque weighed 5 oz. 7½ dwt., was of purely British manufacture, and dated probably from five to eight centuries before the Christian era. To whom the torque belongs will have to be determined by the higher court, but if precedent be followed the Treasury, even if it establishes a claim to the ornament, will restore it to the local museum. Some years ago a very fine collection of Irish torques, which are thin gold plates shaped to the form of the crescent moon, and worn, there can be little doubt, round the neck, came into the possession of the British Museum, but a protest from Ireland led to the specimens being sent to Dublin, where they now form one of the most interesting parts of the national museum.

A NOTICE appeared in the *London Gazette* of August 17th stating that the Privy Council has approved for a further period of one year from September 30th, 1909, the rules framed by the Central Midwives Board in pursuance of Section 3 of the Midwives Act, 1902.

THE General Secretary of the International Medical Congress informs us that 3,000 members have already expressed their intention to be present, of whom 92 are citizens of the British Empire. The first number of the official journal of the Congress, which will be issued on August 28th, will contain the programme of fêtes and receptions; among these will be a ceremony of welcome and conversaziones given by the President of the Congress, the municipality of Buda-Pesth, and the ladies' committee. There will also be a reception at the Royal Hungarian Court, and the presidents of the twenty-one sections will hold conversaziones.

Medical Notes in Parliament.

[FROM OUR LOBBY CORRESPONDENT.]

State Sick Fund.—Mr. Leverton Harris asked the Chancellor of the Exchequer whether, in view of the fact that the Government was going to establish a sick fund and pay probably four millions towards it, and would give a million a year towards insurance against unemployment, he could say when legislation to give effect to these promises would be introduced. Mr. Hobhouse replied that no legislation of this kind would be introduced during the current session.

The Royal Commission on Sewage Treatment.—On Tuesday last Mr. Clough put a question as to the history and cost of this Commission, and Mr. John Burns replied that the Royal Commission held its first meeting on June 21st, 1898. There had been 93 formal meetings for taking

evidence, in addition to a large number of other sittings. Six reports had been issued in several volumes, varying in cost from a few pence to 14s. 9d. Up to July 31st last the total cost of the Commission was £57,578, including the net cost of stationery and printing, but excluding the cost of accommodation. He understood that it was hoped that the final report would be issued in the course of the next eighteen months, and that it was possible that in the meantime there might be a further report on standards for sewage effluents. He was informed that an estimate could not at present be framed of the further expenditure which might be required.

Frozen Meat from China.—Mr. Stanier asked the President of the Local Government Board if he could publish the report of the medical officer of health on the consignment of frozen meat landed by the Peninsular and Oriental steamer *Palermo* at the Royal Albert Docks from China. Mr. Burns replied that he had no doubt that the Medical Officer of Health for the City would ultimately deal with this matter in a report to the Sanitary Committee of the Corporation, which would be printed and issued in the usual way. No general report could be made for some time, as the carcasses would not be thawed and examined all at once, but only as they were required for trade purposes. So far less than 5 per cent. of them had been thawed and examined. Mr. Stanier further asked why a report could not be published at once as the medical officer was examining these carcasses, and Mr. Burns said that it was perfectly true that the Port Sanitary Medical Officer was making a close examination of these carcasses, and he had also instructed the Medical Inspector of the Local Government Board to pay special attention to this subject.

Tetra-chloride of Carbon as a Hair Wash.—In reply to Sir William Collins, the Home Secretary said that his attention had been called to the use of tetra-chloride of carbon as a hair wash; it was not a poison within the meaning of the Pharmacy Acts, and there were, therefore, no restrictions as to its sale. As regards the steps to be taken in the matter, he could only say that the Director of Public Prosecutions had the question of a prosecution now under his consideration.

Royal Army Medical Corps.—Mr. Ashley asked the Secretary of State for War what was the average time that captains and lieutenants of the Royal Army Medical Corps in the British Isles were left in a station without a move during the three years ending March 31st, 1909. Mr. Haldane said the statistics available at the War Office did not enable him to give the required information. The information existed no doubt in the various commands, but it would take a great deal of labour to get at it. Mr. Ashley then asked how many officers of the Royal Army Medical Corps on the active list were serving in the British Isles on March 31st last; how many of these officers, during the year ending March 31st last, received their full leave of sixty-one days; how many over one month, excluding those who were granted their full leave; and how many under one month. Mr. Haldane said that in reply to the first part of the question, the number was 518. As regards the rest of the question, the details of leave granted to officers were not recorded at the War Office. When further pressed he said that there was no record so far as he knew as to the exact amount of leave. If in every command the officer had a record of leave granted it might or might not be accurate. At any rate it would be an enormous trouble to get at it. In reply to a further question put by Mr. Ashley on Tuesday, Mr. Haldane said that 48 officers were serving at Dublin, Belfast, Cork, Kildare, and the Curragh on March 31st last. Of these, 6 had received their full leave, 21 had more than one month, and 21 had less than one month. Some of the last-mentioned had only recently joined the corps, and some officers had returned during the year from stations abroad, where they had already had the leave to which they were entitled.

Typhoid Carriers.—Sir William Collins asked the Secretary of State for War whether he would state what was the nature of the later treatment to which the soldiers treated at Millbank Hospital as typhoid carriers, on whom experimental methods with antityphoid injections had been made, had been submitted; and whether he would lay upon the table papers showing the results obtained by the various methods employed in these cases, in continuation of (Cd. 4609). Mr. Haldane answered that the later treatment alluded to consisted in treating the urinary cases with sodium benzoate and acid sodium phosphate. *X*-ray treatment was being tried in one of the intestinal cases with marked gall-bladder symptoms. It was yet too early to speak of results, but he would be prepared to lay papers on the subject at a later period.

Anthrax Cases.—Mr. Stanier asked the hon. member for South Somerset, as representing the President of the Board of Agriculture, if he could give the number of cases of anthrax in horses, cattle, sheep, and pigs respectively, reported in 1906, 1907, and 1908; and how many deaths occurred through these cases in human beings. Sir E. Strachey, in reply, gave the following table:

Number of Animals Reported as Attacked with Anthrax in Great Britain in the Years 1906, 1907, and 1908.

Years.	Cattle.	Sheep.	Swine.	Horses.
1906	999	83	213	35
1907	1,163	66	190	37
1908	1,107	34	220	58

He had no information as to the number of deaths of human beings attributable to the cases included in the table.

Sleeping Sickness.—Last week Mr. Rees asked whether measures were being taken to prevent the spread of sleeping sickness from German East Africa and the Congo to Northern Nyasaland. Colonel Seely replied that the further investigations which had been made since he answered a similar question on April 28th had failed to reveal the presence in Nyasaland of the tsetse fly which transmits the disease, and, in these circumstances, there appeared to be little risk of the disease spreading from German East Africa and the Congo to the Protectorate. The matter was being closely watched by the local authorities, and, should the occasion arise, they would no doubt take such preventive measures as were possible. In answer to Sir Gilbert Parker, Colonel Seely said that he was not sure whether a report on the whole question of sleeping sickness had been issued. A good many documents had been issued about this very important matter, but he did not know whether there had been one issued concerning Nyasaland. There had been several cases in Nyasaland. When a disease of this frightful character occurred in a district not very far from Nyasaland, sporadic cases might arise; but fortunately the investigations had proved that the tsetse fly, which was the only method of propagating the disease, did not exist in Nyasaland. Big game were not the only home of this particular fly. In answer to a further question last Monday, Colonel Seely said the relation between big game and tsetse fly in Central Africa was a much debated question. A strong committee had been recently appointed by the Colonial Secretary to organize entomological research in tropical Africa, and he had no doubt that this question, among others, would receive its earnest consideration.

Dublin Post Offices.—In reply to Mr. Nannetti, the Postmaster-General stated that the medical officer to the Post Office in Dublin had inspected the head office and each of the branch offices on several occasions within the past twelve months. No record was kept of the dates on which the medical officer did not attend personally at the head office. The medical officer attended regularly at this office, except when on leave or on the rare occasions when special circumstances necessitated his absence.

Scotland.

[From Our Special Correspondent.]

Ancient Monuments of Scotland.

The first Report of the Royal Commission on the Ancient and Historical Monuments of Scotland, just issued, contains an inventory of monuments and constructions in the County of Berwick. From an antiquarian and archaeological point of view it is a most interesting document. The Commission was appointed to make an inventory of the ancient and historical monuments and constructions connected with or illustrative of the contemporary culture, civilization, and conditions of life of the people in Scotland, from the earliest times to the year 1767, and to specify those which seemed most worthy of preservation. They chose Berwick as the first county on which to work, and found no fewer than 260 objects worthy of notice, of which number 70 had not previously been described. This year the Commissioners propose to review the monuments in the county of Sutherland, and if possible those in the county of Caithness.

The Commissioners acknowledge gratefully the help received from the clergy and schoolmasters of Berwickshire. A brief notice of some of the more important and historical monuments, many of which are closely associated with the history and fortunes of the Scottish people, may be interesting:

Ecclesiastical Structures.—Remains of four monastic establishments are noted: (1) The Abbey of Dryburgh, though much ruined, is distinguished by the fine transitional and first pointed details, and for the considerable remains of the conventual buildings. (2) The Priory of Coldingham is the successor of a much earlier structure. A portion of the church alone survives, a transitional building showing details of great beauty. (3) Of the Convent of Cistercian Nuns at Eccles only a mere fragment, of Norman and transitional style, is left. (4) The Priory of St. Bothan is represented by the east wall and by a portion of the north wall of the existing church, and also by the recumbent figure of a princess lying therein. There are remains of Norman churches in other parts of the county, many of them being perfect specimens of Scottish church architecture—mention may be made of Lady Kirk, Cockburnspath, and Lauder.

Castellated and *domestic remains*, though numerous, are mostly unimportant. Some houses of the seventeenth century are still inhabited, as, for example, Wedderlie, Thirlestane, and The Hirsel.

Prehistoric Remains.—(1) Defensive constructions on the ordnance survey maps are noted under the heading of forts. These, for purposes of observation, fall naturally into four geographical divisions: (1) Those in the vicinity of the coast; (2) those inland; (3) those in the hilly districts; (4) those that are occasionally to be found on isolated eminences or other defensible sites throughout the south-eastern or lowland half of the county. An enclosure on Ewieside Hill may be mentioned; it is surrounded by three ramparts, for the greater part in excellent preservation; it shows unusual features at the entrance to the interior. In the region around St. Abbs Head and Coldingham Loch lies a remarkable group, whereof the survival is no doubt due to the fact that many of the enclosures occupy the summits of small rocky eminences unsuitable for cultivation.

There are a remarkable series of enclosures beginning at Warlaw Hill and running along the ridge of Bunkle Edge. The most noteworthy among them is the fort at Preston Clench, surrounded on two sides by three ramparts, which here and there are 10 ft. to 12 ft. in height. In the third division of the county prehistoric defensive constructions are both numerous and important. The most conspicuous examples of these are Longcroft, containing numerous foundations; West Addiston, where the inner rampart on the north-west is still 17 ft. high, and at the entrance shows curious crescentic depressions traversing the roadway with circular foundations in the interior; Tullis Hill, a circular construction in good preservation, with a well-defined rampart of 12 ft. or 13 ft. high above the bottom of the ditch, and a stony rampart on the top of the counterscarp. The defensive enclosures in the southern half of the county are few and unimportant, and have suffered much from the plough.

2. *Sepulchral Constructions.*—Few of these remain intact, and the total number noted in the county is only ten. One of them, however, calls for very special remark—namely, the Long Cairn at Byrecleugh, known by the name of the Mutiny Stones. From its external features this appears to be representative of a type that frequently occurs in the north and west of Scotland in connexion with stone-age burials, but it is the only one of its class hitherto noted in the south-east. There is only one single stone circle in the county, that situated on the moor to the north of Lauder; it is of a large diameter, has the greatest number of its upright stones still *in situ*, and does not appear to have been excavated. Mention is made in the report of the earthhouse at Broomhouse. The entrance has been covered with earth for the preservation of the structure. The village cross at Cockburn's path is a handsome structure, bearing on the four faces of its capital alternately thistles and roses, and is kept in good repair.

Ireland.

[From Our Special Correspondents.]

The Tuberculosis Prevention (Ireland) Act.

A deputation of the Public Health Committee of the Belfast City Corporation, consisting of the Chairman (Alderman Dr. King Kerr, J.P.), the Vice-Chairman (Councillor Gageby), and Councillor Dr. Trimble, recently had an interview with the Local Government Board in Ireland regarding the adoption of this Act. The principal points dealt with were the compulsory notification of certain prescribed forms and the position to be occupied by the Medical Superintendent Officer of Health (Dr. Bailey) in the administration of the Act. The board said the medical officer would be supplied with ample powers to make himself thoroughly satisfied that the person notified as suffering from tuberculosis was likely to be a danger to others, and that everything was being done to prevent the spread of the disease. Subsequently the deputation had the honour of receiving a special invitation to lunch with Her Excellency Lady Aberdeen. At the meeting of the Public Health Committee on August 12th on the motion of Dr. King Kerr (Chairman), seconded by the Vice-Chairman, it was unanimously resolved to approve the adoption of Part I of the Tuberculosis Act.

Belfast Abattoir.

The necessity for providing a fully-equipped abattoir in Belfast has long been admitted by those responsible for the public health administration of the city. Before finally deciding upon detailed plans, a visit was paid by several members and officials of the Corporation to public abattoirs in Holland and Germany and to that which has been recently established in Islington. An interesting report has been issued, giving an account of the conditions which were found in Rotterdam, Hamburg, Berlin, Dresden, Cologne, and Islington, and, among other recommendations made to the Corporation in connexion with the proposed slaughterhouse, are the establishment of a fully-equipped laboratory for the veterinarian and his assistants; the provision of a clothes-room, bathroom, and dining-room for attendants and for butchers and their assistants; that power should be obtained to enforce the stamping or otherwise identifying all meat which has been passed by the inspector as fit for food, and that only men who have had instruction and experience in methods of slaughter should be allowed to kill, while provision should be made whereby a few capable men would slaughter for a moderate fee. This last recommendation appears to be the outcome of certain practical experiments made in the existing Belfast abattoir, in order to decide the respective merits of what the members of the committee who made the report describe as "stunning" and "shooting." The precise signification of these two terms is not quite clear; what we imagine is really meant is "poleaxing" and "shooting," for the results attained by the adoption of either of these methods is to stun. This being so, the different results arrived at when the two methods were

adopted in Belfast are difficult to understand. The flesh of the "shot" animal was said to bleed less readily, and to show signs of putrefaction twelve or fifteen hours before that of the "stunned" animal; on microscopic examination the blood vessels of the "shot" animal were gorged with blood corpuscles, while those of the "stunned" animal were perfectly emptied of blood. These results are not quite in accordance with those obtained by observers elsewhere. At the recent Animal Congress held in London, Herr Heiss, Director of the Straubing Abattoir, stated that, in the slaughterhouse there, 30,000 animals were killed by the shooting method in one year, and it is inconceivable that such a well-recognized authority should continue this system if attended by the drawbacks set out by the Belfast Committee.

INFECTED CLOTHING.

A curious question of sanitary law has arisen in County Tipperary. The Nenagh Urban Council has protested against the use of the disinfecting chamber of the workhouse by the Thurles Guardians to disinfect the clothing of fever patients from the last named union. The Nenagh Council having informed the Local Government Board that it would seize and burn all such clothing, the Board expressed the opinion that "no danger can arise if suitable precautions are taken," and warned the urban council that it should be careful to make certain that it had the power to seize or destroy clothing sent for disinfection.

England and Wales.

[FROM OUR SPECIAL CORRESPONDENTS.]

LANCASHIRE.

COUNTY OF LANCASTER HEALTH REPORT.

IN his quarterly health report for the administrative county of Lancaster, the Medical Officer, Dr. Sergeant, says that the death-rate for the quarter ending June 30th was 13.4 per 1,000. There was a somewhat marked increase in the epidemic death-rate compared with the same quarter last year. Measles contributed no less than 267 deaths, while there was a slightly increased prevalence of scarlet fever. Three cases of small-pox were reported. One case at Middleton and another at Farnworth occurred in persons working in the carding room of a cotton mill, both of whom had been vaccinated in infancy, but not revaccinated. These may be compared with the cases that have occurred at Stockport in cotton workers noticed in our last issue. The third case was an unvaccinated negro, and the origin of the infection could not be traced. Measles was extensively prevalent, and a considerable number of schools had to be closed. In some cases over 50 per cent. of the children were attacked. Several schools were closed also on account of mumps, in one instance 38 per cent. of the scholars being attacked. One school was closed for a month on account of diphtheria, and two or three for scarlet fever. Much attention has been given to river pollution by sewage, and the condition of the river Alt from sewage contamination apparently needs some drastic remedies. The report gives some interesting details of the public health legislation promoted by the Local Government Board. Objection is taken to the clause in the Milk and Dairies Bill which enables a medical officer of health to inspect a dairy outside his own district, and to make an interim order prohibiting the sale of the milk if there is reason to suspect that any cow is suffering from tuberculosis. It is pointed out that the County Councils Association recommended that no local authority should have jurisdiction within the area of any other local authority. It is suggested that it would be a less complicated procedure if the county council were required to take action in respect to any cowshed within its area on complaint from an outside medical officer of health concerning tuberculous milk. Dr. Sergeant also thinks that "a mistake has been introduced in continuing, except in large urban districts, the supervision of dairies and cowsheds by local sanitary authorities, for in the past such administration has not been satisfactory as regards efficiency or uniformity." Attention is also drawn to a new feature in the bill allowing certain sanitary authorities, not being rural districts, to establish and maintain dépôts for the sale of milk specially prepared for consumption by infants under two years of age.

THE MIDWIVES ACT IN LANCASHIRE.

In his report to the Midwives Act Committee, Dr. Sergeant says that at the end of the June quarter the county register contained the names of 964 midwives whose qualifications were as follows: Obstetrical Society of London 70, Liverpool Lying-in Hospital 38, St. Mary's Hospitals, Manchester, 63; certificate by examination of the Central Midwives Board 72, various hospitals 4, and in bona fide practice before the appointed day 717. Of these 853 are actually practising, while 111 have temporarily, for various reasons, ceased to practice. There were 421 records of sending for medical assistance, against 415 in the corresponding quarter of last year. Of these, 11 were for abortions or abnormalities of pregnancy, 332 for difficulties during labour, 44 for complications in the lying-in period, and 34 for the infants. In only 3 cases was medical aid summoned for inflammation of the eyes of infants, and we are told that in no case was the midwife to blame. The number of cases of puerperal fever reported was 37, with 11 deaths, giving a case death-rate of 29.7 per cent. for the quarter; in several instances midwives were reprimanded or cautioned in connexion with puerperal fever cases, the offences consisting in delay in obtaining medical aid, failure to send record to the supervising authority, non-compliance with letter of suspension, etc. One of the lady inspectors reports that in the great majority of cases the midwives' bags and appliances were in a cleanly state and the registers well kept considering the standard of education of many of the "bona fide midwives," and it is said that "a large number of these women are really excellent practical midwives, though they have not the capacity to grasp the requirements of the rules as to keeping books and sending notices." Another inspector says that in some cases much ignorance is displayed and the work of many of the untrained midwives is still very rough. In one of the puerperal fever cases the perineum was badly ruptured and medical aid was not called in until the temperature rose several days later. In one case a midwife had attended a case of miscarriage without suggesting that medical aid should be called in, and the placenta was not expelled until a fortnight later.

WALES.

SHORTAGE OF WATER.

WHILE Swansea is on short service of water, and the inhabitants are bearing with commendable patience a condition of things which leaves them with only three hours' supply a day, the new reservoir at Cray is full to overflowing. At least the wide expanse of water which has been enclosed in the Cray watershed at a cost of £500,000 is only inches from the overflow, and out of its 1,000 million gallons' capacity there are more than 900 millions enclosed and available. The explanation of the shortage is as follows: Before the Cray reservoir was opened Swansea had three other reservoirs in the Velindre area. These provided the ordinary requirements of the town, but the necessities of the future required further provision. This the Cray supplies, and more than supplies; but it was not thought prudent to incur the expense of £100,000 in taking full advantage of the Cray till it was absolutely necessary. Thus, at first a pipe line of 17 in. diameter was laid between the reservoir and the town. This carries 2,500,000 gallons daily, which, with 3,000,000 gallons a day from the older reservoirs, would amply meet all requirements save in case of drought. But the present year is the driest since that year of drought 1887, and while the Cray is still sending down its 2,500,000 gallons daily, and can do so for a whole year if there is not another drop of rain, the older reservoirs have run dry. Thus it is that Swansea is suffering. The Swansea Corporation on August 12th paid a visit of inspection to the Cray Reservoir. The Mayor and Town Clerk were able

to report that the work of laying a second pipe track from the Cray is well in hand. This second line will be 24 in. in diameter, and will carry to Swansea 6,000,000 gallons in addition to the 2,500,000 gallons carried down by the existing pipes. The cost will be £100,000, and the work is being pushed on with such dispatch that, although it has only been in hand for a fortnight, already there are four openings along the route, and half a mile out of the twenty-four miles has been laid. So long as the fine weather prevails, it is expected that about three-quarters of a mile can be laid weekly.

There is practically a water famine at Burry Port also, and if the present drought continues the position will become serious. The inhabitants have been inconvenienced for some weeks past, and the supply at Clyndu appears to have been almost exhausted. Some time ago it was said to be plentiful, the flow of water in June last being about 10,000 gallons per twenty-four hours, but before the end of the month it dropped to 6,000, and in July it was only 4,000. At the present time it is not more than 2,000 gallons, and this is insufficient for the Graig district alone. Several parts of the district are supplied by the urban council water cart. Precautionary measures are being taken to tide over the drought. The position is engaging the serious attention of the council, which, although it has been endeavouring to find a scheme for some years, has not yet succeeded in doing so. Under the provisions of the Llanelly Water Bill, which was recently passed, power was given to the Llanelly Urban Council to lay mains to Burry Port upon application.

Sydney.

[FROM OUR SPECIAL CORRESPONDENT.]

PROGRESS OF CREMATION.

A CREMATION society has recently been established in Sydney with the Hon. Dr. Creed, a member of the Legislative Council, as President. He has addressed a letter to the Hon. C. G. Wade, the State Premier, setting forth the various arguments in favour of the adoption of this practice. In the course of this letter the writer remarks that:

> The health of the people is the most potent factor in the material prosperity of a country, and no government can prudently neglect to adopt any precautions, though possibly incomplete, which tend to its preservation. The State Government is therefore approached to provide the necessary funds for the erection of a crematorium, in a central position, because it would be available for all persons whose death occurs within a reasonable distance of the railway, and because the number of persons desiring to cremate in any one district might not, in the immediate future, be sufficiently great to justify the expenditure of the municipal funds, urgently required for other public purposes, in this direction. When the custom grows, as the experience of all highly civilized countries shows it will, future crematoria might be left to be provided by the local authority.
>
> The Cremation Society recommends that when a crematorium is established no incineration shall take place unless the death is registered, the cause having been certified by a medical practitioner who has been in attendance on the deceased for at least forty-eight hours immediately prior to death, and that the reliability of the certificate has been confirmed by a second doctor, preferably a Government medical officer, who has made fitting inquiry. These certificates having been given and the death registered, a permit to cremate may be granted; such permit, should any suspicious circumstances be afterwards discovered, may be suspended by a stipendiary magistrate or police magistrate, until doubt as to the cause has been set aside, either by further inquiries or a *post-mortem* examination. In default of the medical certificates being forthcoming, no cremation shall take place until after the cause of death has been determined by *post-mortem* examination, except by the special leave of the Minister of Justice. This is to provide for cases of sudden death from obviously natural causes.

So far no reply to this communication has been forthcoming from the Government.

THE BUBONIC PLAGUE.

Two or three further sporadic cases of bubonic plague have occurred in the city. The Board of Health, through its President, Dr. Ashburton Thompson, has made an appeal to the citizens, and especially to those in occupation of business premises in the city, to co-operate earnestly in rendering their premises secure from infestation by rats. With one or two exceptions, all the cases of plague reported this year received the infection on business premises which were so imperfectly protected as to be infested with rats. The long experience of the health authorities goes to show that if the rats were kept outside the houses there would be no epidemic of plague. Unless the citizens do their part, the united efforts of the authorities cannot prevent the spread of contagion. The situation is one that is causing the health authorities much anxiety.

ROYAL PRINCE ALFRED HOSPITAL, SYDNEY.

The annual report of this institution was presented to a meeting of the subscribers last month. The number of beds available at present is 318, and the total number of in-patients treated during the year was 4,778, an increase of 225 on the year 1907. The total number of operations performed was 2,932 as compared with 2,912 in 1907. Professor Anderson Stuart, the Chairman of Directors, in commenting on some features of the report, pointed out that although the total number of patients treated was larger than in the previous year, the average daily number of patients in the wards was less. This was accounted for by the fact that the average stay of patients in the wards was less by one and one-fifth day than in the year 1907. This represented nearly 6,000 days of treatment altogether, and showed what an important thing it was not to keep patients longer than was absolutely necessary. The hospital staff had been increased by the appointment of an honorary pathological chemist and two honorary assistant pathologists, whose work was necessarily having a considerable effect upon the pathological department. The board of directors had been so impressed with the necessity for improving the facilities for work of this kind, that three further rooms had been made available for clinical-pathological work, and £325 was being spent upon the improved equipment of the department, which was being made one of the most complete south of the line. Reference was also made to the proposed transfer of patients from the Coast Hospital to this institution. Last year Sir Joseph Carruthers promised that the Government would remove the Coast Hospital general beds to the Royal Prince Alfred Hospital. The present Government, however, refused to ratify this arrangement, and the Board of Directors found themselves with 150 beds on hand all ready to receive patients, and patients clamouring for admission, but with no means to open the beds. During the past year the board had been in communication with the Minister with a view to the possible opening of 100 beds for the reception of the more important surgical and medical cases now sent to the Coast Hospital. The Government finally decided against this proposal, but promised to allow the directors to draw £ for £ subsidy on subscriptions and donations up to £5,500 a year instead of £4,000 a year as formerly. In consequence it was hoped to open 30 or 40 more beds at an estimated cost of from £45 to £50 a bed. The necessity for enlarging the Nurses' Home was referred to. The home was full, and nearly one-half of the nurses employed at the hospital were at present accommodated in unused wards and other parts of the hospital. There was an overdraft of £1,329 on the Nurses' Home, and a special committee had been appointed to take steps to clear off this debt.

HOSPITAL FOR CHRONIC CONSUMPTIVES.

In consequence of repeated representations to the Government on the necessity for making some better provision for the large number of cases of chronic consumption, a hospital has been erected at Waterfall, a site on the South Coast Railway line some twenty miles from Sydney. Only a part of the original plan has so far been completed, but accommodation for about 150 cases has been provided, and this number has been transferred from the Liverpool asylum, where all destitute chronic cases of pulmonary consumption have hitherto been accommodated. The erection of this new institution will be of immense benefit to the patients themselves as well as an important aid in the crusade against tuberculosis.

PURE FOOD ACT.

The Pure Food Act recently passed in this State comes into force on July 1st. The Advisory Committee appointed in terms of the Act has held sixteen meetings for the

purpose of setting up standards of quality, and is at present engaged in fixing the standard for milk and milk products. One feature of this new Act which is of special importance to doctors and pharmacists is that under it no chemist is to be allowed to repeat the dispensing of prescriptions containing certain drugs, such as opium and its derivatives, without a fresh initialling of the prescription by a doctor. The object of this provision is of course to try to check the drug habit, and to shield the chemist who refuses to dispense indefinitely prescriptions containing drugs which might lead to the patient acquiring a drug habit.

A VALUABLE CONCESSION TO STUDENTS.

The manager of the Orient Royal Mail line of steamers has offered to the Senate of the Sydney University three first-class return passages in favour of graduates of the university who desire to proceed to Europe for the purpose of continuing their studies. The object of the offer is stated to be to multiply the opportunities for education by travel, and the wish is expressed that the privilege will preferentially be conferred on graduates who though wishful to go to Europe are debarred from so doing by reason of the expense involved, rather than on the holders of any particular university distinction as such, or on graduates who are able to dispense with such assistance, and go in any case. The passages will be available during the months from May to September to Europe, and from March to July outwards from Europe, and the limit of time allowed for the return passage is three years. The Senate has expressed its thanks to the company for this very generous offer.

New Zealand.

LUNACY.

THE annual report for the year 1907 of Dr. Frank Hay, Inspector-General of Mental Hospitals in New Zealand, shows that on December 31st, 1906, there were 3,206 certified insane on the register, and 3,240 on the corresponding date in 1907, giving an increase of only 34 for the year, as compared with 94 in 1906 and 89 for the previous ten years. These figures do not exactly represent the number in the mental hospitals, but include patients absent on probation, of whom there were 37 at the end of 1907. The proportion of total insane to total population was 33.15 per 10,000, or 1 in every 302, or, exclusive of Maoris, 34.47 per 10,000, or 1 in every 290 of population. This is the lowest ratio of insanity in the Dominion since 1900. Also in 1907 there was a sharp fall in the ratio of admissions to population, this dropped from 7.16 for 1906 to 6 39 per 10,000, the average for the previous ten years being 6.56 per 10,000. In his report for 1906, Dr. Hay discussed at considerable length the interesting fact that the incidence of insanity among immigrants is not only much greater than that of the European stock born in New Zealand, but considerably greater than the ratio of insanity obtaining in the countries from which the immigrants had come, giving due consideration to age periods. This year Dr. Hay is content merely to call attention to a fact which should be borne in mind when considering New Zealand's insanity rate. Incidentally, the high insanity rate of immigrants into New Zealand and the United States of America affords a curious commentary upon the views of those who maintain that the home countries are being depleted of their best stock by emigration, and who would thus explain their increasing insanity rates.

With regard to the nationalities of the 3,240 remaining on the register at the end of the year, and not counting 36 Maoris, only 1,054 were natives of New Zealand and 106 of Australian States. There were 823 of English, 612 of Irish, and 383 of Scottish birth. Other European countries contributed 130, China 21, and other countries 75. The total cases under care during the year numbered 3,906, and the average number daily resident 3,136.

Admissions.

During the year 700 were admitted, of whom 495 were first, and 205 not-first, admissions. Although the number of admissions was greater than that of 1906 (678), the ratio of first admissions to population was 5.04, as compared with 5.82 per 10,000 for 1906, or with the decennial average of 8.31. As to the duration of disorder on admission, in 304 the attacks were first attacks within three, and in 70 more within twelve months; in 136 not-first attacks within twelve months; in 162, whether first attacks or not, of more than twelve months, and in 28 of unknown duration. No table is furnished giving the forms of mental disorder among the admissions, but, regarding probable causation, alcohol or drug habit was assigned in 85, or 14.83 per cent., syphilis in 15, critical periods in 89, previous attacks in 71, epilepsy in 31, parturition and the puerperal state in 21, moral causes in 37, and the remainder were distributed over the other usually assigned causes. Hereditary influences or congenital defect were ascertained in 132—that is, in 23.01 per cent. of the admissions.

Discharges, Deaths, etc.

During the year 299 were discharged as recovered, giving a recovery-rate on the admissions of 49.67 per cent.; 50 as relieved, 85 as not improved, and 232 died. The deaths, giving a death-rate on the average numbers resident of 7.39 per cent., were due in 62 to cerebro-spinal diseases, including 19 deaths from general paralysis, or only 8.1 per cent. of the total deaths; in 33 to chest diseases (excluding phthisis); in 11 to abdominal diseases; in 8 to accident or violence; and in the remainder to general diseases, including 62 deaths from senile decay, and in 20, or only 8.6 per cent. of the total deaths, to tuberculosis. The high recovery-rate—notwithstanding a progressive increase in the proportion of aged admissions— and the comparatively low death-rate, particularly from general paralysis, dysentery, and tuberculosis, are all favourable features of this report. Dr. Hay shows, however, that the death-rate has been slowly increasing for some years, owing to the accumulation of aged people in the hospitals, the proportion of deaths from senile decay having risen from 6.58 in 1882-6 to 25.52 per cent. in 1907.

Cost.

The total yearly cost per head in the mental hospitals was £34 7s. 9¼d., or, deducting repayments for maintenance, £26 14s. 6¼d.

Since Dr. Hay's last report a new Act has been passed which makes insanity, if deemed to be incurable and which has existed for ten years in the twelve preceding the file of the petition, ground for divorce. Dr. Hay regrets the passing of the Act from the standpoint of the patients. He says that it has been argued that it would tend to limit the procreation of the unfit; but that, in his opinion, "in so far as a serious attack upon heredity is expected to be one of the consequences of the Act, the Act is merely paring the nails of the monster." He points out that in the year under review 299 persons were discharged as recovered, and of this number, including 4 at the age of puberty, 256 were able to reproduce their kind, and of these only one unmarried man and one married Chinaman fulfilled the condition of having been insane for ten of the preceding twelve years. Dr. Hay thus emphasizes the nugatory character of the Act so far as heredity is concerned, and the probability of its exceedingly limited application. Possibly, however, the framers of the Act had no intention of combating the effects of heredity, and meant it to apply only to very exceptional cases.

Queensland.

LUNACY.

THE annual report of Dr. James B. Hogg, Inspector of Asylums for Queensland, for the year 1907, shows that at the close of 1906 the total number of insane persons under the care of the State was 2,032, and on the last day of 1907 2,078, giving an increase for the year of 46, which is less by 10 than the average annual increase for the preceding ten years. The population at the end of 1907 was estimated at 546,467, the ratio of the insane to population being thus on that day 1 in every 262. Of the number remaining at the end of the year 9 were in the reception houses at Brisbane, Rockhampton, and Townsville, and 2,069 in the hospitals for the insane at Goodna, Ipswich, and Toowoomba. The total number of cases under care during the year was 2,373, and the average number daily resident 2,023. With regard to the nationality of those in the State hospitals at the end of the year, 634 were Australian, including 10 aborigines; 484 were natives of England and Wales, 531 of Ireland, 134 of Scotland, and 12 of other British possessions; 22 of other European

countries, 19 of India, 11 of China, and the small remainder belonged to America, Asia, and the Pacific.

Admissions.

During the year 344 were admitted to the State hospitals, 297 being first and 47 not-first admissions, being 17 less than in 1906. Notwithstanding a great increase in the population within recent years, the number of annual admissions, Dr. Hogg says, has been practically stationary. The admissions were classified according to the various forms of mental disorder into: Mania of all kinds, 120; melancholia of all kinds, 81; dementia, 105; general paralysis, 8; epileptic insanity, 21; and imbecility and idiocy, 9. As to causation, the principal of the assigned etiological factors were: Alcohol in 54, or 10.5 per cent.; venereal disease in 21, epilepsy in 19, old age in 17, previous attacks in 23, bodily ill-health in 19, and moral causes in 14. Hereditary influences were ascertained in 49, and congenital defect existed in 7, whilst in 89 no cause could be assigned.

Discharges, etc.

During the year 141 were discharged as recovered, giving a recovery-rate on the admission of 40.99 per cent., 30 as relieved, 3 as not improved, and 1 escaped. During the year 129 died, giving a death-rate on the average numbers resident of 6.38 per cent. The deaths were due in 31 to cerebro-spinal diseases, including 10 from general paralysis; in 54 to chest diseases, including 9 deaths from pulmonary tuberculosis and 21 from pneumonia; in 29 to abdominal diseases; in 11 to general diseases, including 7 from senile decay; and in 4 to accident, including 1 death under chloroform anaesthesia.

Cost.

The cost of each patient per year, after deducting collections, was £21 11s. 7d., or approximately 8s. 3¼d. per head per week.

Reception Houses.

One of these houses is situated at the coastal end of the three main trunk lines of railway, so as to intercept patients and, by timely treatment, save their admission to the hospital. About one-seventh of the patients annually admitted to the houses are discharged after treatment, the remainder being sent to Goodna.

On January 1st, 1907, there were 3 patients in the houses; during the year 250 were admitted, of whom 36 were discharged, 206 transferred to Goodna, and 2 died, leaving 9 in the houses on the last day of the year. Of those admitted 155 were cases of mania, 19 of melancholia, 60 of dementia, 10 of delirium tremens, and 3 each of imbecility and epileptic insanity.

MEDICAL LEGISLATION.

We learn from the *Australasian Medical Gazette* that a deputation from the Queensland Medical Board and the Queensland Branch of the British Medical Association waited upon the Home Secretary in Brisbane recently to urge the importance of the passage of a new medical bill by the legislature. The principal provisions of the bill are the raising of the minimum training required for registration to five years instead of three, as fixed in 1867; the obtaining of power to remove from the *Register* the name of any man convicted of crime, and to charge a fee of five guineas for registration so as to provide the necessary funds for administration. These points were all approved of by the Chief Secretary, and he suggested that the bill might be introduced in the Legislative Council and he would take charge of it in the Assembly. He was prepared further to advise that a small sum should be paid from the consolidated revenue to supplement the funds of the Board to enable it to administer the Act with efficiency.

Special Correspondence.

VIENNA.

Deaths of eminent Physicians.—Abnormalities of Weather.—Warnings as regards Anaesthesia.

THE Medical Faculty of the Vienna University has within a short time suffered the loss of three eminent men who occupied a prominent position amongst their comrades. The eldest was Professor Augustus Vogl, Ritter von Fernheim, Professor of Pharmacology and Pharmacognosy in Vienna, who died aged 75, after forty years of teaching, and when he had attained the highest distinction a medical man can reach in the faculty—Rector of the University and President of the Chief Board of Health of Austria. He was the pioneer of modern research in his branch; the number of his pupils working on the lines laid down by him is a very large one, and they are scattered all over Europe and America, and even in China and Japan. The other professor, who shortly afterwards passed away, was Dr. G. C. Lott, Professor of Gynaecology and Obstetrics. He was well known as the author of many writings on important anatomical and histological points of the female genito-urinary organs. Knowledge of the pathology of the lower uterine segment, so important in determining when active interference is necessary in labour, is mainly due to his researches. He was a self-made man, who had to struggle hard when beginning his career, but by force of energy and tact, as well as by his knowledge, he gradually gained a very influential position. He died at the age of 66 years. The third in the series is Dr. Alfons von Rosthorn, likewise Professor of Gynaecology and Obstetrics. He was appointed successor to Chrobak only in 1907, and during the short time of his directorship of the clinic he has shown himself to be a splendid surgeon and an unusually gifted teacher. He was only 52 years of age; he had obtained the "Venia legendi" nineteen years ago, and was appointed professor of his speciality in Prague in 1898. Thence he was called to Graz, later to Heidelberg, and his scientific and personal achievements prompted the faculty to select him to succeed the famous Professor Chrobak on his retirement. He was the first man to take over the new clinics, the pride of the Vienna hospitals, but it was not his fate to enjoy for many years work in this palace of research. An attack of angina pectoris caused heart failure, and he succumbed to it whilst out on a shooting tour, his favourite recreation.

The abnormal weather conditions that have prevailed in this country for more than a year have had a marked effect upon the reports of the Board of Health as regards morbidity and mortality among the population. Thus, whilst the winter of 1908–9 was unusually dry and cold—Vienna has suffered severely under a water famine in winter time—spring and summer have already not only made up for the deficiency of rainfall, but have even far surpassed their normal figure. The amount of sunshine has been, on the other hand, exceedingly low; March and April have had 50 per cent. less hours of sunshine than the average of the last 115 years, and, whilst May was nearly normal, June had 24 per cent. less, July 56 per cent. less than is due to them. The number of hours of sunshine in July was 123 out of a possible 368. The result is visible in the returns of agricultural labour, and in the absence of diseases of the intestinal organs, especially amongst children. Rheumatic and other "refrigeratory" diseases (affections of the respiratory organs) are, however, increasing, also infective fevers; but still the public health is much better than usual in summer time. The reports from health resorts coincide also in this respect. The practitioners agree in their assertions that the financial aspects of the summer are much worse than in other years owing to the favourable conditions of health. Perhaps the actual influence of the lack of sunshine will show itself a few weeks later.

Several unpleasant occurrences during anaesthesia, coupled with the news of fatal issues of a similar nature abroad, have found their way into the lay press and caused much comment in this country. Partly to reassure the public, partly to call the attention of the profession to the dangers, the "Oberste Sanitätsrath" (Chief Board of Health) has issued an instruction to all hospitals and out-patient departments to have each patient specially examined before putting him under the influence of an anaesthetic. General anaesthesia is to be resorted to only when absolutely necessary. In all other cases, local or partial anaesthesia should be preferred. Surgeons have also been reminded of their responsibility during operation, and special clauses deal with the person who is entitled to administer the anaesthetic. Thus, under no condition may the same doctor anaesthetize and operate on a patient, and the profession is earnestly requested to allow only fully qualified men to do this kind of work. Special classes for students are to be instituted, and the purity of the chemicals is to be ascertained before allowing them to be used. As a rule, the public submit here easily to general narcosis, but the articles in the press have already effected a change in the attitude of the hospital patients.

Correspondence.

THE REPORTS OF THE POOR LAW COMMISSIONERS.

SIR,—I think the concluding section (12) of Chapter 6 of the Minority Report deserves the closest scrutiny of the profession:

"That we do not agree with the suggestion that the establishment of a unified medical service on public health lines necessarily involves the gratuitous provision of medical treatment to all applicants. It is clear that in the public interest neither the promptitude nor the efficiency of the medical treatment must be in any way limited by considerations of whether the patients can or should repay the cost. But we see no reason why Parliament should not embody in a clear and consistent code definite rules of chargeability either relating to the treatment of all diseases, or of all but those specifically named, and of recovery of the charge thus made from all patients who are able to pay. In our chapter on 'The Scheme of Reform,' we propose new machinery for automatically making and recovering all such charges that Parliament may from time to time impose."

While admitting that a much closer approximation of the Poor Law and Sanitary Medical Services might not necessarily involve a gratuitous provision of medical treatment to all applicants, the more the dominant ideas of the Minority Commissioners are considered and their reasoning dissected, the more difficult it becomes to imagine anything but gratuitous medical attendance for all applicants among the poorer classes. It would be hard to deny that it is for the public interest that neither the promptitude nor the efficiency of medical treatment should be limited by the cost; but, as in the case of more than 50 per cent. of the working and lower middle classes of the country it is to be feared the cost does materially affect these points, it is not illogical to suppose that if among the population generally cost is not to interfere with the promptitude and efficiency of medical treatment, the State would be put to rather heavy charges. Indeed, without the socialization of the greater part of the medical profession, such a consummation might seem to many impossible.

Even with a State medical service of the true Socialist type some might object that the "promptitude" and 'efficiency" would not necessarily be better than under the present system. If the Minority Commissioners have in their minds that this "promptitude" and "efficiency" at the State expense is only to apply to a limited class denominated "poor persons," they give no idea how the line is to be drawn; and it might be fairly asked why the lower classes of the nation should get their medical attendance with greater "promptitude" and "efficiency" than the class immediately above them, or why the latter, if it thinks fit, should not "qualify" for this "promptitude" and "efficiency" by endeavouring to enroll themselves in the class beneath. If they did I can see no insurmountable obstacles in the "scheme of reform" to prevent this from taking place.

Even if Parliament were to embody in a clear and consistent code definite rules of chargeability it does not seem to me necessarily to follow that the State would be able to recover more than a small fraction of what it had advanced to improper recipients. The present law with regard to the recovery of ordinary debts in the county courts of the country is neither wanting in clearness nor consistency; but I know too well from experience that it is often of little use to me in recovering ordinary professional charges from many who, I have very good reason to believe, can well afford to pay. The State might be better able to recover debts than a private suitor, but I do not think experience quite bears it out. The Minority Commissioners only propose that charges should be recovered from those "able to pay," and it is to be presumed that the "clear and consistent code" would accurately define that class. I think most medical practitioners in large centres of working-class populations will agree with me that many of their patients from whom they have hitherto derived the bulk of their incomes would have no insuperable difficulty in supporting a plea of inability to pay which the State might find exceedingly hard to refute.—I am, etc.,

London, E.C., August 7th. MAJOR GREENWOOD.

A RATIONAL PUERPERIUM.

SIR,—Will you allow me to make a few remarks on an article entitled "A Plea for a Rational Puerperium" (August 7th, p. 307)? For almost a year now I have been acting in the way this article suggests, and I can corroborate in all details the conclusions arrived at and the benefit derived by the patients. I did not adopt this line of treatment—or, rather, I should prefer to call it the care and attention incident on parturition—until I had sufficient reason to justify me in relinquishing what is to my mind an antiquated and erroneous doctrine—namely, nine, fourteen, or twenty-one days' confinement to bed following childbirth. The population in Ireland numbers over four millions. Of this number probably two millions are monetarily unable to pay a fee to any medical man for attendance at that time, so they come under the care of the dispensary nurse. This portion of the population has been and continues to be the most prolific, or at all events the number of children per family is larger than in any other part of the United Kingdom. And yet we find that amongst this class of the people it is customary to remain not more than three days in bed, or even less, after childbirth, in fact I understand that in training nurses, the bodies issuing certificates direct nurses to attend extern cases for six days if required; why not more if the powers that be act up to the principles enunciated so long ago and still regarded as essential?

In respect to this section who cannot afford to give a fee, we find that in Dublin there are two special hospitals—the Rotunda and the Coombe—to meet the requirements of the middle, south, and west of this country, and the Samaritan Hospital in Belfast, where the Poor Law class from the north are admitted on payment of a fee by the local authority who sends patients.

How can this meagre hospital accommodation meet the needs of the poor if so many cases of flexion, procidentia, and other sequelae, as is claimed, occur when the care of the puerperium is limited to three or four days?

The other side of the picture shows the number of "homes" opened for the reception of patients in Dublin and Belfast, and the number of specialists who can eke out a very respectable existence in this branch of medicine. Surely, if the nine, fourteen, or twenty-one day authorities could show that the number of "homes" was unnecessary for the care of the better class, who carry out the empiricism of the puerperium, then we could accept their teaching; but such is evidently not the case when attention is directed to the statistical side of the question.

I may add that I have had no unsatisfactory results, and all my patients are well pleased and delighted at escaping from the irksomeness of this hitherto trying period.—I am, etc.,

Armagh, Aug. 10th. HAMPTON A. GRAY.

"HOME CONDITIONS AND EYESIGHT."

SIR,—I should like to call Professor Karl Pearson's attention to an investigation on myopia in school children recently published by Professor Straub of Amsterdam.[1] In all, 10,278 eyes were examined by retinoscopy. The children came from four classes of public elementary schools: (1) Where the parents pay at most 1d. a week, and where the children do no home lessons, and are not prepared for continuation schools; (2) schools where the parents pay about 4d. a week, a few children being prepared for continuation schools, but no home lessons being exacted; (3) schools where the parents pay £2 to £5 a year; and (4) where they pay £7 10s. a year. In both these latter classes of schools home lessons are set. Many of the children attending the third class of school, and practically all attending the fourth class, pass on to continuation schools, and have to go in for examinations. These four classes of schools, therefore, form an ascending scale in respect of the amount of book-work required. Straub's statistics show that there is a corresponding ascending scale in the growth of myopia among the

[1] V. Graefe's *Archiv für Ophthalmologie*, vol. lxx, part I.

children of the same ages attending them. Here is his table:

Schools.	6–7 years.			8–9 years.		
	No. of Eyes.	Myopic Eyes.	Per-centage.	No. of Eyes.	Myopic Eyes.	Per-centage.
1st Class	1,445	19	1.3	1,570	34	2.1
2nd Class	420	2	0.4	424	5	1.1
3rd Class	492	2	0.4	568	18	3
4th Class	313	2	0.6	287	13	4.5
	10–11 years.			12–13 years.		
1st Class	1,244	34	2.7	743	29	3.9
2nd Class	431	12	2.7	285	18	6.3
3rd Class	550	29	5.2	443	38	8.5
4th Class	322	30	9.3	263	25	9.5

It will be seen that, with one exception, the prevalence of myopia corresponds to the amount of book-work to which the children's eyes have been subjected. The exception is that up till the age of 10 the poorest class of children include an undue proportion of myopes. This is explained by the fact that cases of infantile myopia are relatively common among the poor. They can obviously have nothing to do with school work, and are generally associated with a strong hereditary tendency. The figures prove that for the ordinary form of myopia school work, and especially home lessons, are largely responsible, though no one would deny that heredity is also a factor. It is one, however, which the public authority is powerless to influence, whereas in school conditions directly, and in home conditions indirectly, its influence is great. Professor Pearson disclaims the wish to discourage attempts to check the intensification of myopia in the schools. I am afraid that his arguments, if they were accepted, would have just that tendency.—I am, etc.,

A. HUGH THOMPSON, M.A., M.D.

RADIOGRAPHERS AND TREATMENT.

SIR, — With the advent of radiography and radiotherapeutics a new class of specialist has arisen, specially expert in radiographic diagnosis and in the treatment of such diseases as are benefited by exposure to *x* rays, radium, Finsen light, etc., and most important hospitals now have medical men on the honorary staff who devote themselves to these special subjects. These appointments being of comparatively recent date, however, the exact relationship that should exist between these experts and their colleagues on the honorary medical and surgical staffs has not in some cases been fully determined, and a pronouncement by the BRITISH MEDICAL JOURNAL as to what the relationship should be would be of great value. Of course it goes without saying that in this, as in all professional relationships, mutual courtesy and consideration for each other and for the welfare of the patient should be the rule and guide of conduct. But difficulties arise occasionally which are apt to cause a little friction. For instance, cases are sent from the medical and surgical wards for *x*-ray examination. What is the proper course for the radiographer to adopt? Is he to make a screen or skiagraphic examination and send a written report, giving concisely an account of the conditions he has observed as the result of his examination, and also his diagnosis?

This would seem the more reasonable course to pursue, more especially seeing that the screen examination is frequently more instructive than a skiagram, and is also the part of the examination which cannot be communicated to another otherwise than verbally. Some surgeons and physicians, however, look upon the radiographer as a sort of superior bottle-washer, and resent his report and diagnosis, requiring only a skiagram from which they hope to draw their own conclusions. This attitude would seem unreasonable for various reasons: first, because the interpretation of a skiagram is a matter requiring as much, if not more, experience and expert knowledge as, say, the interpretation of the appearances seen by ophthalmoscopic examination of the fundus oculi; and this expert knowledge is much more likely to be present with the radiographer than with the surgeon or physician, who examines a mere fraction of the number of skiagrams the radiographer does; and, secondly, because in many cases only the person who takes a skiagram and knows the relative positions of tube, patient, and photographic plate at the time of exposure can possibly read it aright.

Then, again, with regard to radio-therapeutics, when a patient is sent to the radio-therapist, from one of his medical or surgical colleagues, for treatment, should the former, who has usually most expert knowledge on the subject, have the case handed over to him to treat according to his own discretion, as, say, a surgeon has, when a case is transferred from the medical to the surgical wards, or should he receive his instructions for treatment from his medical or surgical colleague, who sends the case to the electro-therapeutic department for treatment, and who often has but a very hazy knowledge of the treatment?

These are matters which require clearing up.—I am, etc.,

August 4th. RADIOLOGIST.

SIR,—The general practitioner is groaning under the opposition of hospitals in London, but at the same time he should remember that the medical men attached to hospitals are in thorough sympathy with him. The want of union between medical men is shown in its worst light by the way they send their patients to instrument makers and chemists to have *x*-ray photographs made, while they avoid sending them to the medical men who are engaged every day at hospital at that work. The instrument makers and large chemists have found in some cases that it pays them better to hand on the patients sent to them to an independent layman in order to have *x*-ray photographs made. This, of course, is a business transaction, and commission is required by the wholesale chemist or instrument maker, so that no qualified *x*-ray worker gets any of these cases. They also go to those *x*-ray workers who advertise in doctors' diaries. The qualified *x*-ray worker, of course, cannot advertise, and the general practitioner thus may not know to whom to send his patient. There is, however, no need for him to have any doubt about that, as nearly every hospital has an *x*-ray department, and the medical officer in charge of it is ready to welcome a patient in private for *x* rays. The lay *x*-ray workers are usually expert photographers, and frequently turn out triumphs of photographic art. These are in every case prints; such prints, except for gross fractures, are valueless. The temptation to an expert photographer to improve the shadows he gets on his plate must be very great. He knows how to touch up, whereas the medical man does not, and therein lies a safeguard to the patient. The writer has seen these touched-up prints more than once, and while admiring the photographic skill displayed has felt sorry for the patient. The last one he saw was a hip-joint in which the roughened edges of osteoarthritis had been beautifully removed and an apparently normal joint shown, while a skiagram which he himself took showed a typical osteoarthritic joint.

The general practitioner is not, however, the only one who sends his patient to a layman. The staff of a hospital would be expected to support their own *x*-ray worker; yet very often they pass him over and a layman takes his place.

I enclose my card.—I am, etc.,

X RAYS.

THE PROFESSION AND THE STATE.

SIR,—Dr. Williams's letter (BRITISH MEDICAL JOURNAL, July 10th, p. 110) is well-timed. It is quite useless as well as unpatriotic to urge a private interest against a public benefit.

The true cause of all this bickering and heaping up of grievances is, as I have pointed out before, the unequal pressure on the profession of the law of supply and demand. If there were not too many of us for the requirements (or at any rate the resources) of the population, we should

hear nothing of reduction of vaccination fees, disputes with guardians, clubs, and postmasters-general. With plenty of work we should simply decline underpaid contracts, and cease to tumble over each other to reach the illusory gold mine. "One who has Suffered," for instance, with scope to increase his practice in other directions, would meet his employer with a simple *non possumus*. As it is, I presume the presence of a rival not fully employed forces him to submit to the increase of work without extra remuneration, the ignominy and cruel hardships he laments.

Why does the law of supply and demand press unduly on our profession? Again our own fault. We make a show of being a greater success than we are. With unphilosophical adherence to the dictum of this mammon-worshipping age that success in money-getting is the true standard of ability, we pretend to have work though all our actions cry loudly the reverse. Has one ever heard of a medical man (outside one's own private acquaintance) who was not "getting on splendidly"? Yet for every wretchedly-paid appointment there are scores of eager, and even unscrupulous, applicants.

So the students pour in to qualify to share the rich rewards of medical practice, to find later on that "the unorganized medical profession (unorganized because organization is impossible among the unemployed) is being crushed and tyrannized over to meet the demands of organized labour"; to find also that in spite of appearances and of what their teachers tell them, there is no effective demand for more doctors, and to realize that the struggle for a mere existence must take precedence of the humanity-serving ideal.

Of course the plight of the medical profession is but a phase of the general unemployment problem that affects all the workers of the nation. There are not really too many doctors for the needs of the people, any more than there are too many bootmakers, but only more than the people have money to support; but I think that the foregoing is the reason why the disease of unemployment, gradually extending from one class of worker to another, has reached the doctors rather earlier than the other professions.

The investigation now proceeding in the Journal into the actual conditions of medical practice would be productive of real benefit to the profession if the information it elicits could be widely diffused among the public from whom the profession is recruited; and the letters of the Lancashire Division to head masters of public schools were also a move in the right direction. Give us a little ease in the competition for a livelihood, and all grievances will right themselves. Complaints and disputes are only useful in so far as they enlighten the middle-class public as to the disadvantages under which the profession labours from overstocking.—I am, etc.,

Overcrowded.

THE DOCTOR AS A PHILANTHROPIST.

Sir,—As one who has lived in Australasia for many years, I should like to express my opinion of the present position of the profession in England and its cause.

I have always been in the happy position of being able to refuse all contract work, and to refuse to reduce my fees unless just cause was shown for doing so; as a result I always earned a comfortable living and more, at fees from 15 per cent. to 25 per cent. more than my neighbours who were prepared to cut fees to catch work. My experience of accidents has been that, unless the patient was known to me in a "street" accident, I never yet received a fee; therefore, I persistently refused to go out when called unless to the patient's own house if he was unknown to me, and never to a "street" accident. I have travelled much, and make a rule of charging all those who request my services, unless I am ship's surgeon, and find that the fees are forthcoming without comment, but are "never offered voluntarily."

I find the position of medical men in England far worse than it was sixteen years ago, and, though an apparent rise in fees has taken place, the actual rise is not in the same proportion as the rise in the cost of living, which I should put at 25 per cent.

The position of medical men to-day is simply due to insane competition. I daily see examples of what men are prepared to do for so-called charity, but which is really a means of advertisement.

The advice given to a young man is always, Start with the poor, and be content to work for nothing at first. This advice has been adopted so as to include attendance on any one who is mean-spirited enough to accept it, who can pay for their attendance by sending paying patients and "recommend the doctor."

It is this so-called charity that lowers the profession and has degraded it in the eyes of the public. I have frequently in Australia been threatened with an appeal to the police when I have refused to attend some well-to-do working man who systematically swindled every one, but I never heard of him lacking attendance and medicine.

There is a hospital near here with fourteen beds and no out-patient department; there are twelve honorary medical officers, and the board wish to add to the number; there are plenty of applicants. If a comparison between the salaries offered to town clerks, secretaries of boards, and other positions requiring little more than a clerical training be compared with the salaries offered for fully qualified medical men the disproportion is enormous. A member of my own family is now earning £450 per annum whose sole qualification for the post was a knowledge of drill for school children, whereas I should find it difficult to earn more than £300 a year examining these same children under the new Act.

It seems to me that if the profession is entered by men who are prepared to work for the ridiculous fees with which they are discontented, they only have themselves to blame.

Charity is very well in its proper place, but to say that the charity of the medical profession of to-day is anything but mainly compulsory owing to the degraded value of the profession in the eyes of the public is absurd, and the degradation is due to the action of the profession itself. Apart from the awful wastage of life and health that occurs in those who enter the profession, from the commencement of their student days, the life of incessant drudgery for most and the "on-the-end-of-a-string" existence demands high recompense.

That old saying about the noble profession and the miserable trade is all very well, but my experience is that unless the profession learn also that the labourer is worthy of his hire, they will continue to be slaves to a dread of the opinion of a public which has learnt to despise the profession as a pack of fools.

I wonder, too, whether the public appreciate that it is a law of commerce that you can only buy a certain value for a certain price.—I am, etc.,

Anglo-Colonial.

THE PROFESSION AND POLITICS.

Sir,—Under the heading of "The Postmaster-General and our Profession," "Observer" raises a point of vital interest to the medical profession. He speaks of the "Utopian notions as to the objection to the profession using its vote to advance its own selfish interests." Are the interests of the profession selfish? I think not. If these interests are neglected good men will not care to enter the ranks, and this would in itself be a loss to the nation. Again, are not the so-called *selfish* interests the interests of the next generation of medical men? Are we not to consider them? Is it not selfish of us, for fear of being considered ourselves selfish, neglecting those who follow on? As a profession we are too fond of taking a back seat, as the saying is. In many countries the medical men are often great leaders in the political world, and I contend that should be the case here. We have through our work a vast knowledge of the lives of the people, of their wants, of their work, and yet year after year our noble profession neglects a most sacred duty by not taking an active part as a whole in, at any rate, the domestic politics of the nation. Is there a single member of Parliament (non-medical) who knows the lives of his constituents as well as any practitioner in the district? Is there any clergyman who has as intimate knowledge of the needs, social and physical, of his parishioners as the general practitioner who works amongst them? The needs of the community at large, both rich and poor, physical, moral, and social, are known better to the doctors than to any other class of men. Are we always

to content ourselves with giving advice to one here and there, and collecting our fees, and giving a few subscriptions to churches and children's outings? Are we never going to join hands and become prominent in politics, bringing our great knowledge of the nation to aid in the counsels of the Legislature?

Is it not a matter of shame that we have no "Minister of Public Health"? And yet the most powerful body of men in the world, if they only would realize it, is not represented by one of the heads of the State.

The attitude of most medical men towards politics was summed up by a picture in *Punch*, when the doctor informed his patient that his politics depended on who he was attending. Is not this selfish? hiding our political opinions in a politic manner for fear of losing a few guineas.

We have a Labour Party in Parliament. Why not a Medical Party? It would have much to do even in its own department—the ambulance arrangements throughout the country in many big towns are a disgrace to a civilized nation, civil pensions of eminent medical men, administration and enforcement of Food and Drug Acts, housing of the poor, physical education of children, development and encouragement of "back to the land" schemes, garden cities, Factories Acts, miners and eight-hour day, child labour, temperance questions.

These and other political matters it is the duty of the medical men of the present day to take an active part in, even if it means a slight pecuniary loss.—I am, etc.,

Leytonstone, Aug. 15th. ARTHUR TODD-WHITE.

CHARGE FOR MEDICINES AND DRESSINGS AT HOSPITALS.

SIR,—It might be replied to those who raise objection to payment from out-patients that these are the first steps towards contributory payments, as the rule, for all but extreme paupers. Had a professional man and not a director or banker invented the plan in force at the London Hospital and elsewhere, he would have put it differently. He would have said to the out-patients, "This small contribution will show (1) that you are not paupers, and (2) that you are grateful to the doctors for their skilful advice. You can have the needful medicine for nothing. The amount of your payments will be given, nine-tenths to the funds of the hospital, and one-tenth to Epsom College and the British Benevolent Fund."

Allowing, however, that it is permissible to charge for medicine, there is another way. A few weeks ago the report of a provident dispensary came into my hands. There is a contributory payment of one penny a week from every patient, which all goes to the doctors. The doctor writes a prescription and the patient takes it to one of three local chemists. The cost of this with all expenses of administration is defrayed by voluntary subscriptions. I would like also to refer to a correspondence on the question, Whether as a measure of hospital reform if no medicines, but prescriptions, were handed to out-patients, ordinary pharmaceutical chemists would undertake the work. This appeared in the *Pharmaceutical Journal* of April and May. I am of opinion that the road to reform lies in this direction, which would appear from that correspondence to be quite practicable from the chemists' standpoint.—I am, etc.

Kensington, August 7th. G. CRICHTON, M.D.

THE DANGER OF FLIES.

SIR,—I have long been convinced that the *Musca domestica* plays a vastly more important part in the dissemination and propagation of pulmonary tuberculosis than is usually suspected. Spillman and Haushalter of Nancy have recently published some striking evidence in support of the contention that phthisis may be contracted from the house fly. They made a very large number of experiments with and examinations of flies caught in the rooms of consumptive invalids, and in the ward of a hospital where tuberculous patients were under treatment. Living tubercle bacilli were found not only in the bodies of the insects, but also in fly specks and excremental matter scraped and collected from the windows and walls. It is very certain that this microbe-laden material, when reduced to the form of dust, would have no difficulty in finding entrance to the human system through both respiratory and alimentary tracts. I should here like to place on record an experience that occurred in my practice a short time back.

On visiting a sick cottager I found the bedroom infested with flies; it was an ordeal to remain in the apartment more than a few minutes. The patient was suffering from a mammary abscess which had burst, and which the nurse in attendance was treating with applications of pledgets of lint dipped in "sanitas." On leaving the cottage the nurse asked me if I could suggest anything for getting rid of the flies, and I told her to spray the walls, ceiling, floor, and furniture freely with sanitas. When I visited the case a few days later not one fly could be seen in the sick room. Probably *propter* as well as *post hoc* may be inferred in the clearance effected.—I am, etc.,

July 27th. MEDICUS.

ARYLARSONATE TREATMENT OF SYPHILIS.

SIR,—Colonel Lambkin in his interesting paper on the arylarsonate treatment of syphilis, in the BRITISH MEDICAL JOURNAL, August 14th, p. 380, recommends in certain cases the simultaneous use of mercury and the arylarsonates.

It has been stated by Professor Hallopeau of the St. Louis Hospital, Paris,[1] that corrosive sublimate dissociates atoxyl. Were the two drugs administered simultaneously this might give rise to accidents. He advocated, before beginning mercurial treatment, to wait fifteen days until the atoxyl was eliminated from the system.

I have for several years used mercury perchloride, $\frac{1}{16}$ grain three times a day, as the routine treatment for cases of syphilis, and I expect there are a good many others who follow a similar course, preferring a soluble mercurial salt to an insoluble one. It would therefore be important and useful to know whether the more recent arylarsonate preparations, namely, soamin and arsacetin, are not affected in the same way as atoxyl by corrosive sublimate.

It may not be out of place to add a few words on the small experience I have had in the use of atoxyl. By itself this drug does not seem to have any material effect on the early secondary manifestations of the disease, nor do injections of the drug prevent the onset of secondary symptoms, as stated by Professor Metchnikoff at the Berlin Medical Congress in 1907. The fact that it produced unpleasant symptoms in one of my cases (headache, dizziness of vision, numbness and pain in the arms and legs), and the published reports of cases of optic atrophy following its administration, caused me to abandon its use.

The papers read by Colonel Lambkin and Major French indicate that the newer preparations are more stable and constant in composition, and therefore less liable to cause untoward accidents.—I am, etc.,

FERNAND L. DE VERTEUIL.
M.D. (Edin.), M.R.C.S., L.R.C.P., Surgeon R.N.

Sheernesss, August 16th.

⁂ Soamin and atoxyl are two names for the same drug. (See BRITISH MEDICAL JOURNAL, 1909, vol. i, p. 370.)

CANCER RESEARCH.

SIR,—Dr. Drage still does not seem to wish to understand that the principle I advocated of regulating treatment by the blood count has nothing to do with sodium cinnamate, though, as he is evidently aware that the count is not very materially altered by its use, I am surprised at his saying that I have been inspired by him.

The three drugs mentioned are not of necessity incompatible, and there is more than one way of mixing them.

To make it, I hope, quite clear, the principle I advocated was to try and rectify the condition of the blood cells and haemoglobin known to be caused by cancer, and the practice was to give soamin, green citrate of iron and ammonium, and sodium cinnamate, but not as "incompatible mud." That the use of the cinnamate goes against the theory I am quite willing to allow. Dr. Drage is entirely in error; but if he had any foundation for his

[1] BRITISH MEDICAL JOURNAL, June 15th, 1907.

complaint, what is it all about? The use of the cinnamate is, perhaps, one little step in advance; the regulation of treatment by the blood count is, perhaps, another. Could any one claim more at present?—I am, etc.,

London, W., Aug. 16th. SKENE KEITH.

THE KINAESTHETIC AREA OF THE BRAIN.

SIR,—I suppose no one disputes the fact that the so-called motor area of the brain includes the termination of association and sensory fibres, as well as the cell bodies of neurons whose axonal prolongations constitute the pyramidal tract. In other words, it contains efferent as well as afferent elements. I presume Dr. Bastian will agree to this, but if so, his position appears to be somewhat paradoxical. The coexistence of both afferent and efferent elements justifies us in calling this area sensori-motor. If Dr. Bastian does not regard the efferent system as motor to carry nervous impulses to the motor cells of the spinal cord, etc, perhaps he will be kind enough to render his position clearer to your readers by stating what he considers to be the function of the pyramidal tract.—I am, etc,

London, S.E., Aug. 17th. W. H. B. STODDART.

Medico-Legal.

THE LIABILITIES OF HOSPITALS TOWARDS PATIENTS.

AT page 876 of the JOURNAL for April 3rd, 1909, an account was published of an action brought by a late patient of St. Bartholomew's Hospital, against its Governors, the Lord Mayor, the Commonalty and Citizens of the City of London. The case was one in which the plaintiff, who had returned from the West Coast of Africa in a bad state of health, was admitted in order that the cause of a neuritis of the sciatic nerve might be determined. He was placed under an anaesthetic and alleged that during the examination one of his arms was burned by a hot-water can, and the other compressed against the side of the table, with the result that both his arms became paralysed.

Mr. Justice Grantham, after hearing the plaintiff's case, decided that the real cause of the condition stated to exist after the examination remained as obscure as before the evidence of the plaintiff and that of his witnesses was given, that no negligence on the part of the surgeon had been proved, and that even if it had been the surgeon was admittedly not a person for whose actions the governors were responsible. Mr. Justice Grantham therefore entered judgement for the defendants without submitting the case to the jury. An appeal was lodged, mainly on the ground that the question of negligence should have been left to the jury and was heard in the Appeal Court by the Master of the Rolls, and Lords Justice Farwell and Kennedy, and their reserved judgement, dismissing the appeal with costs, was delivered on July 23rd.

In the course of his judgement in which the other judges concurred, Lord Justice Farwell, after a summary of the more specific facts of this particular case, made an important statement as to the general law concerning the liabilities of hospitals towards patients. It was now, he said, settled that a public body was liable for the negligence of its servants in the same way as private individuals, notwithstanding that it was acting in the performance of public duties like a local board of health, or of eleemosynary and charitable functions like a public hospital. The extent to which their property could be made liable to execution was another question. In the present case the first question was: Were any of the persons present at the examination servants of the defendants? It was, in his opinion, impossible to contend that the surgeon or the assistant surgeon, or the house-surgeon, or the administrator of anaesthetics, or any of them, were servants of the governors in the proper sense of the word; they were all professional men employed by the defendants to exercise their profession to the best of their abilities according to their own discretion; but in exercising it they were in no way under the orders or bound to obey the directions of the defendants. The true relations of the parties was well stated by the Chief Justice in "Glavin *v.* Rhode Island Hospital." "The physicians or surgeons are selected by the corporation or the trustees. But does it follow from this that they are the servants of the corporation? We think not. If A out of charity employs a physician to attend B, his sick neighbour, the physician does not become A's servant, and A, if he has been duly careful in selecting him, will not be answerable to B for his malpractice. The reason is that A does not undertake to treat B through the agency of the physician, but only to procure for B the services of the physician. The relation of master and servant is not established between A and the physician. And so there is no such relation between the corporation and the physicians and surgeons who give their services at the hospital. It is true the corporation has power to dismiss them, but it has this power not because they are its servants, but because of its control of the hospital where their services are rendered. They would not recognize the right of the corporation, while retaining them, to direct them in their treatment of patients." The only duty, continued Lord Justice Farwell, undertaken by the defendants was to use due care and skill in selecting their medical staff, a duty similar to that undertaken by trustees, namely, to bring such skill and care to bear on the affairs of their trust as the reasonable man of business brings to his own. It was not suggested that there was any negligence in this particular respect; indeed, the plaintiff went to the hospital on purpose to be under the care of the particular surgeon who had attended him. The three nurses and the two carriers stood on a somewhat different footing, and he would assume that they were the servants of the defendants. But although they were such servants for general purposes, they were not so for the purposes of operations and examinations by the medical officers. If and so long as they were bound to obey the orders of the defendants, they were their servants, but as soon as the door of the theatre or operating room had closed on them for the purposes of an operation or examination they ceased to be under the orders of the defendants, and were at the disposal and under the sole orders of the operating surgeon until the whole procedure had been completely finished; the surgeon was for the time being supreme, and the defendants could not interfere with or gainsay his orders. This was well understood, and was indeed essential to the success of operations; no surgeon would undertake the responsibility of operations if his orders and directions were subject to the control of or interference by the governing body. The nurses and carriers, therefore, assisting at an operation ceased for the time being to be the servants of the defendants, inasmuch as they took their orders during that period from the operating surgeon alone and not from the hospital authorities. Nor was the contract of the hospital one by which it undertook to nurse during the operation. It merely undertook to supply nurses and others, in whose selection it would take due care. The relation of the hospital to the patient in respect of nurses and attendants supplied by the former for an operation on the latter was the same as that of an association of nurses to the patient supplied by it with a nurse, as decided by the Appeal Court in the case of Hall *v.* Lees. The nurses were not put in the place of the hospital, to do work which the governors of the hospital intended to do themselves, because the governors had not undertaken to operate or assist in operating, but only to supply qualified persons to act as nurses and assistants under the control of the operating surgeon. He would test the point by enlarging the case put by the American Chief Justice. Suppose that a good Samaritan not only employed the surgeon, but took the patient into his own house, and gave him the services of his own servant, whom he believed to be a skilful nurse, in order to assist the surgeon in an operation; the same reasoning would apply—there was no more undertaking by A to assist the surgeon in the operation than there was to operate; the undertaking was the same in both respects—to procure the services of surgeon and nurse reasonably believed by him to be competent. He was therefore of opinion that the defendants were not liable at all to the plaintiff. But even if the nurses and carriers were persons for whose negligence the defendants would be liable the plaintiff would still fail, because it was clear that they were not liable for the negligence of the surgeon. The plaintiff had to prove his case against the defendants, but he did not do so by showing that he had been injured by the negligence of either A, B, C, or D, or of one of them, when the defendants were liable for the negligence of C and D only, and not for that of A and B. He must prove that the defendants were liable, and did not do so by showing that if C and D were the negligent persons the governors would be liable; but if it was A and B, then they were not. He must prove affirmatively that the negligence was that of the persons for whom the defendants were liable.

DEATHS UNDER ANAESTHESIA.

AN inquiry was held in Southwark on July 16th into the circumstances attending the death of a boy who died at Guy's Hospital under anaesthesia. The operation in view had not been commenced. The boy was suffering from extensive heart disease, and it was hoped that his condition would be improved by the removal of portions of two ribs. The anaesthetic was A.C.E., and was administered by one of the staff of visiting anaesthetists, who chose this mixture in preference to pure ether, and gave it on folded lint. Dr. Spilsbury, pathologist to St. Mary's Hospital, who performed the *post-mortem* examination, said that death was due to syncope, brought about partly by the extensive heart disease, partly by a condition of status lymphaticus. The jury returned a verdict to the effect that death was due to misadventure, and that all due care had been taken in the treatment of the case.

Another inquest on a further death under anaesthesia at the same hospital took place on July 30th. The patient in this case was a woman aged 44, and she, too, died before the operation—radical treatment of breast cancer—had been commenced. The anaesthetic was given by one of the visiting staff of anaesthetists, who chose chloroform because the stoutness of the patient made ether undesirable. When respiration failed ether was injected into the heart muscle, and the heart itself massaged through an incision in the middle line of the abdomen. Artificial respiration was also tried. On autopsy the heart was found to be the seat of fatty degeneration, and death was ascribed to the failure of its action under the influence of chloroform. The jury returned a verdict of accidental death, adding that every care had been taken in the administration of the anaesthetic.

In response to questions put to him by Dr. Waldo, the coroner, one of the surgeons of the hospital stated that the steps taken in this case in the hope of saving the patient's life were necessary, but that they, of course, could only be properly carried out by a qualified medical man with an adequate knowledge of anatomy and surgery. Similarly no dentist, unless a fully qualified medical man, would be able to perform the tracheotomy sometimes rendered necessary during nitrous oxide gas administration, owing to a tooth falling into the air passage. The anaesthetist stated that the chloroform used was prepared from acetones which he personally considered as safe as the more expensive forms of chloroform. To this the coroner replied that other anaesthetists had informed him that the more expensive methylic and ethylic chloroforms were pleasanter for the patient and safer to use than acetone chloroform.

In the course of this and the previous case Dr. Waldo also drew the attention of the juries to the general subject of anaesthetic administration and to the bill recently introduced in the House of Commons. During the past eight years he had held inquests on forty-one deaths under anaesthesia at Guy's Hospital. In thirty-three of them the anaesthetic was chloroform. Eighteen months ago one of his juries added to a verdict a rider to the effect that the authorities of Guy's Hospital ought to ensure that in all serious operative cases the anaesthetic should be administered either by, or under the direct superintendence of, one of the staff of visiting anaesthetists, and that specially qualified resident anaesthetists ought to be appointed at large institutions such as Guy's, since it was often at night that the more difficult cases had to be dealt with. Since then they had until the past fortnight no deaths under anaesthesia at this institution. There were no reliable statistics at present as to deaths from anaesthetics; their occurrence was not invariably reported, and in the Registrar-General's returns the particular anaesthetic used was not disclosed. There were two defects in the bill regarding administration of anaesthetics now before the House of Commons. It was surely wrong that dentists with their limited clinical, anatomical, and surgical knowledge should be allowed to administer general anaesthetics unless they were fully qualified medical men, and nothing was said about the giving of local anaesthetics by injection. Cocaine, for instance, was a powerful poison, uncertain in its action, and in unskilled hands often dangerous in its effects. Co-operation in such cases between dentist and doctor would be to their advantage, and, what was of still more importance, would conduce to the safety of the public.

The Deputy Coroner for Bournemouth held an inquiry on July 24th into the circumstances attending the death of a woman aged 51, while undergoing a dental operation. The patient turned a bad colour when five or six teeth had been removed, and was promptly laid on the floor and subjected to artificial respiration. The anaesthetic was administered by a medical man, who said he had been giving anaesthetics for ten years successfully. In this case he gave nitrous oxide, followed by ether, and finally by "two or three whiffs of chloroform" to keep her under a little longer. Shortly after the extractions had begun collapse occurred ,and the patient died in spite of all his efforts. The medical man who made an autopsy said the condition of the heart showed that it had failed in its action. A sister of the deceased, a trained nurse, who was present at the operation, deposed to the anaesthetic having been carefully, and as it appeared to her, skilfully administered. The jury returned a verdict of death from heart failure, exonerating the medical man from all blame.

In the Westminster Coroner's Court, on August 4th, another case of the same order was investigated, the deceased being a boy aged 13, the only son of Lord Lilford. It was stated that he had been in good general health, but three medical men in consultation had advised the removal of adenoids from the back of his throat and nose. The anaesthetist said that he had examined the patient on the day previous to the operation, and, except for the adenoids, found everything was normal, and the boy was quite confident and very cheerful. The anaesthetic (one part chloroform and two parts ether) was given on an open Skinner mask. It took about six minutes to get the boy under. One set of adenoids were then removed, and by way of preparing for the removal of the next, the witness was pumping the anaesthetic through a nasal tube, when breathing suddenly ceased. Oxygen was administered, and artificial respiration kept up for four and a half hours, but proved unavailing. Dr. Salisbury Trevor, pathologist to St. George's Hospital, said that on autopsy he found that death was due to failure of respiration in a patient suffering from the condition known as status lymphaticus, such failure being precipitated by the administration of the anaesthetic. The jury returned a verdict of accidental death.

ACTION FOR DAMAGES AGAINST AN EDINBURGH HOSPITAL.

An action by a patient against the Edinburgh Hospital and Dispensary for Women and Children for £100 damages, in respect of injury, has been decided by Sheriff Guy. The pursuer, Mrs. Margaret Smith, claimed damages in respect of an injury received through being burned on the leg by a hot-water bottle while under the influence of an anaesthetic in the defenders' hospital. Sheriff Guy found for the pursuer, and awarded £25 damages. In a note he states that it is regrettable that the defenders should have allowed the case to go to a judgement, for it appeared to him that they had taken a completely erroneous view of the pursuer's legal position and claim, and endeavoured at all hazards to clear the hospital from any blame in the matter. When the case came to be defended the defenders were forced to admit that the pursuer was burned by the hot-water bottle, and their defence had been confined to showing that there was no negligence on the part of any one for whom they were responsible. All the witnesses for the defence excluded carelessness from their view, and were driven to account for the burn by the imaginary special susceptibility for burns which the pursuer possessed, but of which there was absolutely no proof. The defenders produced a hot-water bottle cover, as showing the kind of cover used in the hospital. It was, of course, impossible to expect that they should produce the actual cover; but if this cover was to be taken as a sample of the covers in actual use, he did not wonder that the pursuer was burned. He was not, of course, proceeding upon the condition of the wretched sample produced, but all that he could say was that if those responsible for the conduct of affairs in the defenders' hospital were careless enough to produce such a sample in a court of law, then it was to be presumed that they would be careless enough to use a cover in as bad a condition as the sample.

EXAMINATION OF INJURED WORKMAN.

Sanitas submits the following question: An insurance company recently asked C., a general practitioner who acts as referee for the company, to visit A., an injured workman, who was claiming compensation. On calling, C. was informed that A. was in the hospital, and on interviewing the house-surgeon and asking permission to see the patient, the house-surgeon demurred, suggesting that the company should arrange a consultation between C. and himself with a view to a joint report. C. thereupon wrote to the company explaining the situation.

*** We are of opinion that C. is entitled to a fee for his visit to the patient's home. It would perhaps have been better if C. had reported to the company the removal of the patient to the hospital and awaited instructions. If C. had received directions to visit and report on the patient at the institution and the house-surgeon had demurred, the patient's right to compensation or the proceedings under the workmen's compensation might be suspended until the examination had taken place.

Universities and Colleges.

ROYAL COLLEGE OF SURGEONS IN IRELAND.

Notice has been issued that preparations sent in competition for the Barker Anatomical Prize (£21) must be placed in charge of the Curator of the Museum on or before April 30th, 1910. The competition is open to all students whose names are on the anatomical class lists of a school in the United Kingdom; the part named for dissection being the cervical plexus. The marking scale is 60 for merit of dissection, 20 for excellence of setting, and 20 for originality. Unsuccessful competitors whose dissections show sufficient merit may be refunded such amount of the cost of their production as the examiners think fit. In virtue of the terms of the will of the late Dr. Barker, formerly curator of the museum of the college, the judges of the competition are the President and Curator of the College of Surgeons and the Professor of Anatomy at Trinity College, Dublin. Further particulars as to the conditions of the competition can be obtained on application to the present Curator, Mr. A. H. White.

Obituary.

Old students of King's College must have read with regret the announcement of the death of Alfred Philipps, who, for more than thirty years held the responsible position of Resident Medical Officer of the Finsbury Dispensary. Dr. Philipps was painstaking, hardworking, and diligent; his chief aim—the goal of his ambition—was to relieve pain, to cure disease, and to prolong life; how far he succeeded, the thousands of patients whom he attended could testify. By his colleagues he was held in affectionate regard, and by the Committee of Management and Governors of the Institution he loved so well the highest respect and esteem was entertained for this eminently efficient officer. Dr.

Philipps, who took the diploma of M.R.C.S. in 1863, and that of L.S.A. in 1864, died at the age of 68, at Savoy Mansions, and was buried at Bridgwater, Somerset. *Multis ille bonis flebilis occidit.*

The Services.

ROYAL ARMY MEDICAL CORPS.

EXAMINATION FOR PROMOTION.

Stations Abroad (except India).

THE following candidates were successful at the May examination in technical subjects for promotion of majors of the Royal Army Medical Corps:

Major A. E. MASTER, (*d*) ii; .75. Has yet to pass in Technical Subjects.

Major A. C. FOX, (*d*) ii. Has yet to pass in Technical Subjects.

Major P. EVANS, Technical Subjects; .8 in Medical History, etc. Already passed in (*d*) ii.

Major JOHN M. BUIST, Technical Subjects; .8 in Sanitation and Epidemiology and in Medical History, etc. Already passed in (*d*) ii.

Captain E. A. BOURKE, (*d*) ii; .75. Already passed in (*h*).

Lieutenant R. G. ARCHIBALD, (*h*) ii. Already passed in (*d*) ii, and in (*h*) i and iii.

Lieutenant G. B. EDWARDS, (*d*) ii; and in (*h*) ii and iii. Already passed in (*h*) i.

Lieutenant J. H. SPENCER, (*d*) ii; and in (*h*) ii and iii; .8 in (*h*) ii and iii. Already passed in (*h*) i.

Lieutenant J. A. B. SIM, (*d*) ii; .75. Has yet to pass in (*h*) i. Already passed in (*h*) ii and iii.

Lieutenant R. C. GALGEY, (*d*) ii; and in (*h*) ii and iii. Already passed in (*h*) i.

Lieutenants W. K. BEAMAN and H. G. GIBSON, (*d*) ii; and in (*h*) ii and iii. Already passed in (*h*) i; .75 in (*d*) ii.

Lieutenant H. M. J. PERRY, (*h*) ii and iii. Has yet to pass in (*d*) ii. Already passed in (*h*) i.

Lieutenant J. C. HART, (*d*) iii; and in (*h*) ii and iii; .75 in (*d*) ii, and .8 in (*h*) ii and iii. Already passed in (*h*) i. Special Certificate.

Public Health AND POOR LAW MEDICAL SERVICES.

REPORT OF MEDICAL OFFICER OF HEALTH.

Doncaster Urban Sanitary Authority.—The report of Dr. Lechmere Anderson for the year 1908 deals with an estimated population of 31,108 persons, the density of the occupied area being 18.3 persons to an acre. He also gives some particulars concerning Wheatley and Balby-with-Hexthorpe, and as these places form, he says, with Doncaster a compact township of 44,579 persons, he gives in some instances a combined figure for the three areas. Thus, the combined birth-rate was 26.1 per 1,000, which closely corresponds with that of England and Wales as a whole. The birth-rate of Balby, however—a place which has a population of between 8,000 and 9,000 persons—was very much higher, being 35.8 per 1,000 living. The general death-rate for the whole township was 13.5, and it is noticeable that Doncaster, which had much the lowest birth-rate, had also the highest death-rate. The infantile mortality figure was equally unfavourable to Doncaster, for while for the combined township it stood at 132.3 per 1,000 registered births, the rate in Doncaster was 147. Dr. Anderson appears to be paying special attention to tuberculous disease, and returns the death-rate from all forms as 1.9 for the combined township, this being some improvement on the average of the past eight years. Voluntary notification of phthisis has been in force in the area since the beginning of the year 1903; it does not, however, appear to be a very effective procedure, and it may be gathered that Dr. Anderson would favour the introduction of compulsory notification of this disease. There are two isolation hospitals in the area, and one of these, which hitherto has been reserved for small-pox, has now been set aside for consumptive patients. From the details given, the building would appear to be well suited to the purpose in view, and Dr. Anderson congratulates his authority on being the first in the West Riding, to the best of his belief, to provide a building for the open-air treatment of this disease.

UNDER the will of the late Mr. George Edward Crawhall of Newcastle-on-Tyne, which has now been proved, the Royal Victoria Infirmary, Newcastle, and the Natural History Society, Newcastle, are made residuary legatees. The amount which they will divide between them is upwards of £2,000.

Letters, Notes, and Answers.

BRITISH MEDICAL ASSOCIATION AND BRITISH MEDICAL JOURNAL.

THE offices of the British Medical Association and of the BRITISH MEDICAL JOURNAL are at 429, Strand, London.

COMMUNICATIONS respecting Editorial matters should be addressed to the Editor, 429, Strand, London, W.C.; those concerning business matters, advertisements, non-delivery of the JOURNAL, etc., should be addressed to the Office, 429, Strand, London, W.C.

TELEGRAPHIC ADDRESS.—The telegraphic address of the EDITOR of the BRITISH MEDICAL JOURNAL is *Aitiology, London.* The telegraphic address of the BRITISH MEDICAL JOURNAL is *Articulate, London.*

TELEPHONE (National):—
2631, Gerrard, EDITOR, BRITISH MEDICAL JOURNAL.
2630, Gerrard, BRITISH MEDICAL ASSOCIATION.
2634, Gerrard, MEDICAL SECRETARY.

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C., on receipt of proof.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

CORRESPONDENTS not answered are requested to look at the Notices to Correspondents of the following week.

MANUSCRIPTS FORWARDED TO THE OFFICE OF THIS JOURNAL CANNOT UNDER ANY CIRCUMSTANCES BE RETURNED.

In order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL, and not at his private house.

☞ *Queries, answers, and communications relating to subjects to which special departments of the* BRITISH MEDICAL JOURNAL *are devoted will be found under their respective headings.*

QUERIES.

MANAOS asks for advice as to the cause and treatment of severe and constant "twitchings" or spasmodic contractions of the legs when going to sleep each night. His patient is a woman, aged 36 years, healthy, active, married, no children. She is kept awake night after night for an hour or more with these involuntary movements of the legs. He was told the movements continue some time after sleep ensues.

HOSPITAL FOR THE TROPICS.

H. W. T. (Liverpool) wishes to know where he can procure plans or ideas for a small hospital. It is for Europeans, and must be adapted for the tropics, preferably bungalow style.

*** We can hear of no publication dealing specifically with this subject, but Professor Simpson's *Principles of Hygiene in Tropical and Subtropical Countries*, which contains a chapter on the construction of houses, might be consulted.

INFECTIOUS HOSPITALS AND PERSONAL DISINFECTION.

M. O. H. writes: Having been recently appointed medical officer to a small isolation hospital, and being engaged in private practice as well, I am anxious to know what other members occupying a similar position do to ensure that they shall be free from infection (especially streptococcal) when leaving the hospital. This seems to me of great importance with regard to midwifery.

ANSWERS.

S. R. VAIKOM.—The Leonard Hill sphygmometer is made by Messrs. Hicks according to Dr. Hill's instructions, and is, we are informed, a reliable instrument.

PERPLEXED.—Upon the facts stated there is no reason why the lady should not become pregnant. An opinion as to whether any treatment is desirable could only be formed after examination.

DISINFECTION OF ROOM.

DR. S. G. SLOMAN writes in reply to an inquiry (August 14th, p. 431) as to a spray apparatus suitable for disinfecting lofty rooms after infectious diseases, that he has just bought a spraying apparatus for killing aphides on fruit trees which he thinks would answer the purpose. Mr. J. Alfred Eggar, c/o Farnham, Alton and Districts Farmers' and Hopgrowers' Co-operative Association, Limited, 74, Castle Street, Farnham, would supply particulars about the apparatus which is described as spray pump with bamboo extension, £1 16s.

RECOVERY OF THE ABATEMENT OF DUTY ON PETROL.

D. P.—The abatement of the duty on petrol to be allowed to medical men will in the ordinary way be claimable by way of repayment through the local officer of Customs and Excise. A certificate must have been obtained from the vendor of the motor spirit in the following form: "Sold to A. B., of Y., *x* gallons of motor spirit on which full duty has been paid to the Crown." This may be written on an invoice or delivery note. Under the present regulations relating to the use of motor spirit for non-dutiable and half-dutiable purposes the spirit must have been received in quantities of not less than 2 gallons at one time, and the claim must be made for not

less than 6 gallons and within six months of the time when the spirit is used. The certificates must be kept and delivered to the local officer of Customs and Excise with an application for repayment of duty and a declaration on an official form to be obtained from him and signed in his presence, stating the quantities used and the use to which the spirit has been put.

LETTERS, NOTES, ETC.

UNSATISFACTORY RESULTS OF THE TREATMENT OF PNEUMONIA.

DR. ARTHUR J. MATHISON (Wood Green, N.), in a note on this subject, writes: Dr. Osler's eloquent and suggestive address on "The Treatment of Disease," recently reported in your columns, has again drawn attention to the truly remarkable lack of progress in the therapeutics of pneumonia. The number of deaths attributed to pneumonia, and the fatality of the disease in people previously quite healthy, should rouse us at length to make a special effort to discover what surely must be discoverable—an efficient means of treating a patient attacked by pneumonia.

The possession of extensive clinical opportunity of research is a talent of the use of which the public has a right to demand an account, and this talent is in the hands of a few leading clinicians. This being so, I would suggest a pneumonia conference for London, and would appeal to our leaders to attend and make it a success. Let all methods of treating pneumonia be tried simultaneously, each plan applied to the same number of cases, and each by a different physician. At the conference to be held at the conclusion of these trials, reports in each case should be given as to (1) mortality, (2) relapses, (3) complications, and (4) length of convalescence. Only methods of treatment with average or less than average mortality should be persevered with.

I feel that probably some definite progress would be assured by some such organized scheme; and at the very least the medical conscience would be appeased, and the ground cleared for future action. The want of extensive clinical opportunity prevents the accumulation of convincing cases. I advocated in the BRITISH MEDICAL JOURNAL of 1906, vol. i, a treatment of acute lobar pneumonia, and I still practise it. The mortality is at present *nil*. But with no hospital appointment and no club practice, does this absence of mortality mean much to the casual eye? for I firmly believe that several cases aborted through early treatment, and thus the actual number of cases of pneumonia is small even after the lapse of years. Dr. Osler has given us in his address a list of the requirements in an efficient remedy for pneumonia. Would not such a combination as that I advocated in 1906 fulfil all these wants when given with care and the effects carefully watched? Let us remember Hunter's crisp remark, "Don't think, but try!"

RUPTURED BASILAR ARTERY: PROFUSE FROTHING FROM MOUTH AND NOSE.

DR. FREDERICK D. WELCH (Wood Green, N.) writes: The following case is, I think, worth recording on account of the extraordinary amount of froth which kept welling out from the patient's mouth and nose for several hours after she was first taken ill. I was called to see the patient, a woman aged 32, on January 2nd, 1908. I was told that she had suffered from headaches for several weeks, but was always able to do her housework; she had complained of sudden severe pain in her head about ten minutes before my arrival, and had at once fallen unconscious. The bowels had acted daily. She gave no cry, and there was no history of fits of any sort. At this time she was frothing most profusely from nose and mouth; when the froth was wiped from her mouth it filled again in a few seconds, completely obliterating all view of the tongue and back of throat. As the pulse was only just to be felt I gave her a hypodermic injection, and on getting her on to a bed and examining her carefully, I found that there was no paralysis or twitching of arms, legs, or face. The tongue was not bitten, and no faeces or urine had been passed. The pupils were equal, semidilated, and reacting sluggishly to light; the face was not flushed, and nothing abnormal was to be found in heart or abdomen. The respiratory murmur was loud all over the chest, but otherwise there was nothing abnormal in the lungs. There was no oedema of legs, and urine was stated to have been normal in quantity and appearance. She remained completely unconscious, and did not alter in any way (except that the pulse gradually improved, and continued to beat about 85) until 3.30 p.m., when she vomited once, bringing up, so far as I could guess, about 6 pints of dark-brown liquid, with no solid matter in it. Soon afterwards she regained partial consciousness, being conscious for four or five minutes at a time, and able to speak faintly and move her limbs. I found then the pupils reacted to accommodation, and there was no paralysis of the tongue. These intervals of partial consciousness of a few minutes at a time continued till 8.30 next morning, when she lapsed finally into complete unconsciousness. The profuse frothing continued welling from her mouth till 2 p.m., the day after the attack, when it stopped rather suddenly, and she died at 6 p.m.

I concluded it was a case of ruptured basilar artery, but no *post-mortem* examination was made. The tremendous amount of frothing from the mouth and nose was very extraordinary, and I have never seen anything like so large a quantity in any other case in hospital, asylum, or otherwise; if collected, it would have amounted to a considerable number of pints, as it saturated pillows and seemed never going to lessen. The single vomit shot out without any warning 5 ft. or 6 ft. out beyond her mouth.

QUININE IN SYPHILIS.

DR. ARTHUR LOXTON (Birmingham) writes: May I call to mind that the severity of any given case of syphilis depends largely upon the financial and hygienic circumstances of the individual? A poor man may be expected to fare much worse at the hands of syphilis than the rich, provided the rich man uses his fortune to accelerate the cure. In Birmingham we see practically no malignant syphilis, but in common with all large centres we have a great deal of severe syphilis associated with anaemia and other forms of tissue degeneration depending upon bad food and faulty hygiene. It is among the poor chiefly that the value of iron as an adjunct to the treatment of syphilis is so apparent. In my hospital work the addition of 5, 10, or more grains of ammonio-citrate of iron and the mercurial is almost a routine measure; and this practice has grown up insensibly in the course of years, because it has been forced upon me that the tissues of the poor are so frequently unable to respond to the specific action of mercury until their nutrition has been improved. The more cachectic the patient the larger the dose of iron I prescribe; and the more severe cases of ulceration always receive the iron in the form of the liq. ferri perchlor. Frequently it is a good plan to stop all mercury by the mouth, and to give it by inunction—with intelligent patients this is always better—reserving the digestive tract for tonics and wholesome food. The ointment I have used for years is the ung. hydrarg. oleatis (*B. P.*), 1 drachm, to be rubbed into a non-hairy part of the body each night; and a holiday taken once or twice a week is usually sufficient to prevent salivation. This interferes very little with the clothing, and is quite as effective and much less disagreeable than the old-fashioned blue ointment. It is a mystery to me why text-books continue to recommend this time-honoured abomination. Finally, let us remember that treatment of syphilis by tonic drugs is part of the larger treatment by hygiene. In our student days we are taught to associate syphilis with mercury and iodide of potassium; hygiene is possibly thrown in as an after-thought. I often wonder if we should not do well to reverse the position and dwell upon hygiene and proper food, throwing in the mercury and iodide to round off the paragraph.

IODINE FOR STERILIZATION OF THE SKIN OF OPERATION AREAS.

MR. J. W. LINDSAY (of Belén, Paraguay, South America) writes: During June last I was present at various operations for radical cure of hernia done by the surgeons of the Aberdeen Royal Infirmary. After one such operation the surgeon said to me: "Have you seen the articles on the use of iodine in preparing the skin for these operations? I should think it would be a good 'tip' for you to use in your cases abroad." "Oh!" I replied, "I was using the same method long before I saw any notice of it." "Then why did you not write about it? You might have been famous by this time." On May 13th, 1908, I painted the line of my proposed incision in a hernia case with linimentum iodi. I did it to mark where I was going to cut on the following morning, and with no idea of using it as an antiseptic measure. The wound healed by "first intention." Later I used the same method in a mastoid operation, in an appendicitis case, and in another hernia case, and always with, to me, surprising results. I used linimentum iodi, which produced practically no irritation in the Spanish-American Indians who form the bulk of my clinical material. I have been very interested in reading of the more general use of this method, and hope that surgeons resident in tropical climates will find it as reliable a measure as I have done.

TOUCHING FOR THE KING'S EVIL.

Dr. S. D. CLIPPINGDALE (London, W.) writes: I send you a copy of a notice I found in an old newspaper at the Guildhall Library to-day. It refers to the ceremony of "Touching for the King's Evil," and the royal physician is claiming a respite:

"This is to give notice, That His Majesty hath declared his positive resolution not to *heal* any more after this present April until Michaelmass next. And this is published to the End that all Persons concerned may take notice thereof, and not receive a disappointment."—(*The Intelligencer*, April 17th, 1665.)

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

	£	s.	d.
Eight lines and under	0	4	0
Each additional line	0	0	6
A whole column	2	13	4
A page	8	0	0

An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Wednesday morning preceding publication: and, if not paid for at the time, should be accompanied by a reference.

N.B.—It is against the rules of the Post Office to receive letters at *Postes Restantes* addressed either in initials or numbers.